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ESTIMATION OF KARLUK LAKE EARLY AND LATE RUN SOCKEYE RETURNS
BASED ON SCALE AGE DATA, 1985-1994

By

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INTRODUCTION

The Karluk River system, located on the west side of Kodiak Island, supports notable chinook, sockeye, pink, and coho salmon runs utilized by commercial, recreational, and subsistence fishers and wildlife, particularly brown bears. This drainage includes Karluk, O'Malley, and Thumb Lakes, and numerous tributaries (Figures 1-3). Karluk Lake, at 19.6 km long, 3.1 km wide, with a surface area of 3,900 ha, is the largest waterbody on Kodiak Island. Among the salmon species utilizing the Karluk drainage, sockeye salmon are the most commercially significant and valuable for sustaining wildlife populations. Annually, adult sockeye salmon enter the Karluk system from late May through late September (Figure 4; Barrett and Nelson 1994). Spawning occurs within a variety of habitats including nearly all the lake inlet streams and lake shoals (Groot and Margolis 1991). Rearing juvenile sockeye salmon utilize Karluk, O'Malley, and Thumb Lakes for usually two to three years prior to smolting (Koenings and Burkett 1987). The significant number of age 3. smolt is unique to Karluk and can be used as a natural age marker for identification of returning adults (Swanton and Nelson 1994).

Karluk was at one time considered one of the largest sockeye salmon producing systems for its size in the world, with terminal catches in the late 1800's often exceeding 2-million fish (Foerster 1986; Gard et al. 1987). Recently, Karluk's sockeye production has been considerably less than in early years, however it is still considered a major Kodiak sockeye system. A variety of factors probably contributed to the production decline including but not limited to excessive harvesting in the early part of this century, reduction in lake fertility, and decreases in rearing fry survival (Barnaby 1944; Rounsefell 1958; Owen et al. 1962; Koenings and Burkett 1987).

Accurate assignment of sockeye catch to the Karluk system is essential for forecasting, evaluating escapement goals, and run timing determination. In the 1800's, nearly all the commercial fishing on Karluk sockeye was conducted using beach seines at the Karluk River spit (Roppel 1986). During those early years, catch assignment was simple; whatever was harvested at the Karluk spit was assigned to the Karluk system. In the early 1900's, the opportunity to fish in the outer bays and capes was realized through the pioneering efforts of commercial fishers using fish traps and purse seines. By 1922 fish traps were common in Uganik and Uyak Bays, and by 1931 they accounted for 57% of the catch (Roppel 1986). With a major shift in fishing effort from the terminal area at the Karluk spit to outside waters, there was concern that multiple stocks may be contributing to the fishery which would compromise the accuracy of catch assignment to the Karluk system. To determine the origin of the sockeye catch in these outer waters, Rich and Morton (1929) tagged 700 sockeye salmon on 19-20 August 1927 at Broken Point (Uganik Bay). On the basis of 403 recoveries, they concluded that Karluk was the stock of origin for all sockeye salmon caught between Cape Karluk and West Point (Uganik Bay). Rounsefell (1958) reaffirmed this assertion when he reported that the 1904-1953 catch assignments to Karluk were probably

reasonably accurate, especially for the 1904-25 period based on: (1) the low frequency of non-Kodiak sockeye salmon recoveries in the Kodiak Island area as identified from the August tagging experiments; (2) the likelihood that some island bound salmon were probably harvested in mainland fisheries, which would balance the non-Kodiak fish harvested in the Kodiak area; and (3) the relatively low abundance of other Kodiak sockeye stocks relative to Karluk .

Research conducted by Thompson (1950) and Rounsefell (1958) postulated that there were three Karluk sockeye runs: a spring run with a migration through 21 June; a summer run or middle run migrating from 22 June through 16 August; and a late run with migration timing post 16 August. The middle run was considered to have been harvested much more intensely than either the early or late runs which lead to its presumed demise.

Currently, the Karluk system is managed for a bimodal time of entry on two runs, an early and a late run. The early run escapement period is from 25 May to 21 July, with the peak being around 12 June (Barrett and Swanton 1992; Barrett and Nelson 1994). The late run escapement occurs from 22 July to 31 September and peaks about 7 September. There is almost a five week period between the runs when sockeye abundance is low (Figure 4). The early run escapement goal was adjusted in 1992 based on spawner recruit data (1980-1986) and limnological characteristics which indicated that a reduction in the early run goal to 150,000-250,000 was desirable. The late run minimum escapement goal increased from 310,000 to 400,000 (Prokopowich et al. 1994).

In this report, we use a natural age marker to estimate the number by age class of Karluk bound sockeye salmon harvested in the westside Kodiak commercial fishery from Raspberry Cape south to Sturgeon Head for 1985 through 1994. Early and late run numbers are estimated separately and brood tables are constructed. Additionally, we address the likelihood that early century catches of local and non-local origin were misclassified to the hypothesized Karluk middle run stock.

METHODS

Escapement Enumeration and Sampling

The 1980-1994 salmon escapement numbers for Karluk, Red River (Ayakulik), Upper Station, Dog Salmon (Frazer), and Uganik Lake (1990-93) were obtained from the Alaska Department of Fish and Game (ADF&G), Commercial Fisheries Management and Development Division database of weir counts for the Kodiak Management Area. At each weir location (Karluk, Red River, Upper Station, and Frazer) about 240 sockeye salmon were sampled weekly for age,

length, and sex. Remote sampling at Uganik Lake occurred annually during the peak escapement (n=600) using a beach seine. Exceptions occurred in years 1990-1993 when a weir was installed at Uganik River and operated by FWS. During this period, weekly samples were taken on a fish available basis with a targeted total sample size of 600 fish. A single scale was collected from each fish sampled for age classification following the convention of the International North Pacific Fisheries Commission (INPFC 1963). Specific sampling procedures are reported in ADF&G (1994). Preparation of scales along with age designation rules followed Koo (1962). Ages were assigned using a microfiche reader (48x lens) and recorded using European notation. When ocean age was questionable due to scale margin resorption, length-at-age frequency distributions were used to estimate ocean age. Ocean ages were assigned based on known ocean age ratios at specific length intervals for each sex. Daily age composition was estimated using linear interpolation between sampling events. Additional procedures for summarizing age composition data are reported in Blackburn (1993).

Catch Numbers and Sampling

Commercial catch numbers were compiled from ADF&G databases created annually using individual harvest receipts (fish tickets). These databases were used to obtain daily commercial sockeye catches from the Northwest Kodiak District by statistical area and the Inner and Outer Karluk and Sturgeon Sections. Geographically, this encompasses the westside of Kodiak Island from Raspberry Cape south to Sturgeon Head, and includes Kupreanof Strait, Viekada, Terror, Uganik, and Uyak Bays (Figure 2).

The Northwest Kodiak District commercial sockeye harvest in Uganik Bay (statistical areas 253-11 through 253-35) and Uyak Bay (statistical areas 254-10 through 254-40) was sampled weekly with a targeted sample size of 600 fish (scales) per area per week. Scales were collected at a variety of processing facilities throughout the Kodiak Management Area in order to provide adequate representation of the catch. The Southwest Kodiak District including the Inner and Outer Karluk Sections (255-10 and -20) was sampled less frequently, while the catch in the Sturgeon Section (256-40) was not sampled. Scale collection, age assignment, and reporting procedures were the same as used for escapement samples. Reported catch-at-age estimates may not equal the total catch due to rounding.

Estimation of Catch Age Composition by Area and Week

Area	Procedure
Uyak and Uganik Bays	<p>Sampled daily catches were assigned the age composition of the sample; catch on non-sampled days was assigned the linear interpolated age composition value for that day as derived from adjacent samples. Daily catches which occurred before the first catch sample or after the last sample were assigned the age composition of the sample collected closest in time. The exceptions applied to unsampled catches post 15 August as follows: (1) weekly catches that occurred within two or less weeks of the last sample were assigned the age composition of that sample; (2) a catch period of seven days or less that occurred more than two weeks after the last weekly sample, was assigned the Karluk late run escapement age composition from the following week; (3) a catch extending over a period of greater than seven days that occurred more than two weeks after the last weekly sample, was assigned the age composition of the Karluk late run escapement for the season. In all situations where escapement was used to estimate the catch age composition, the escapement age composition was adjusted to 100% after removing the age .1 components to account for gear selectivity .</p>
Inner and Outer Karluk and Sturgeon Sections	<p>Sampled daily catches were assigned the age composition of the sample; catch on non-sampled days was assigned the linear interpolated age composition value for that day as derived from adjacent samples. Daily catches which occurred before the first catch sample or after the last sample were assigned the age composition of the closest sample collected. When a weekly catch sample was available from the Inner and Outer Karluk Sections but not for the Sturgeon Section, the Karluk catch sample was used to describe the age composition of the Sturgeon Section catch provided the Karluk sample was collected within two or less weeks of the Sturgeon catch. When a Karluk catch sample did not exist and a catch occurred during a seven or less day period, the catch was assigned the age composition of the Karluk escapement sample from the following week. If the catch occurred over a period of more than seven days, the catch was assigned the age composition of the Karluk escapement summary for the early or late run depending on when the catch occurred. In all situations where escapement was used to estimate catch age composition, the escapement age composition was adjusted to 100% after removing the age .1 components.</p>

Karluk Catch Assignment

Early and late run contributions were estimated independently in all calculations. All catches through 15 July were treated as the early run migration period, while post 15 July catches were treated as the late run period. The corresponding escapement periods were pre 22 July (early run) and post 21 July (late run).

Uyak and Uganik Bays

Three assumptions were made in estimating the Karluk contribution to the Kodiak westside sockeye catch. The first was that age 3. fish were present only in the Karluk system, and therefore were a natural marker of Karluk sockeye salmon. The second was that there was significant gear selectivity against age 3.1 and other age .1 fish. Lastly, it was assumed that the proportion of non-age 3. Karluk fish in the Karluk bound catch was the same as the non-age 3. fish in the Karluk escapement. Following these assumptions, only the age 3.2, 3.3, and 3.4 fish from the catch and the escapement were used to estimate the other ages of the westside Karluk catch. To adjust for the potential bias of age .1 fish, the percent age compositions of the catch and the escapement were recomputed to 100% with the age .1 fish excluded. The contribution of all non-age .1 Karluk fish was then estimated using the following formula:

$$X_{ij} = B_{ij} / A_j * 100$$

Where:

- A = Estimated percentage of age 3.2, 3.3, and 3.4 fish in the Karluk escapement.
- B = Estimated percentage of age 3.2, 3.3, and 3.4 fish in the catch.
- X = Estimated percentage of non-age .1 Karluk River fish in the catch.
- i = specific catch area
- j = run (early or late)

If $B > A$, then assume $X = 100\%$

After the number of non-age .1 Karluk fish was estimated, an age class composition was applied to the non-age .1 Karluk River fish in the catch. The age 3.2, 3.3, and 3.4 fish in the catch were assigned 100% to Karluk; the remaining non-age .1 components were determined from the age composition of the Karluk escapement as adjusted to 100% with the age .1 and age 3. components removed.

The age .1 Karluk catch component was estimated by: (1) assigning all of the age 3.1 fish in an areas catch to Karluk; and (2) using the ratios of age 3.1 to age 1.1 and age 3.1 to age 2.1 within the escapement to calculate the number of age 1.1 and age 2.1 fish in the catch.

An example of the Lotus spreadsheet used for estimating the Karluk component of the catch is provided in Appendix A.

Inner and Outer Karluk and Sturgeon Sections

Sampled sockeye catches from Inner and Outer Karluk and Sturgeon Sections were assigned to Karluk using the same analyses applied to Uganik and Uyak Bays. During weeks when a catch sample was not available, the catch was assumed to be 100% Karluk fish and age composition estimates were determined using the appropriate Karluk escapement age composition after removing the age .1 component.

Run and Return Numbers

In this document, the run is defined as catch plus escapement in numbers of fish, while return is the estimated number of adults produced from a particular brood years escapement. Karluk run numbers by age class were determined by summing the escapement and assigned catch numbers by age class and year. Karluk return numbers by age class were estimated by assigning the run numbers by age class to their respective parent year escapement. Reported run-at-age estimates may not equal the total run due to rounding. Return-per-spawner estimates were calculated by dividing the return by its respective parent year escapement.

RESULTS

The estimated age composition of Karluk early run sockeye escapements from 1985 through 1994 identify a significant number (>15%) of age 3.2 and 3.3 sockeye salmon (range 15.6% (1989) to 70.3% (1993)). Age 3.2 and 3.3 fish from all other major Kodiak systems individually represent less than 5% of the escapement (with the exception of Red River at 7.8% in 1993) through 21 July (1985-1994; Tables 1 and 2). The 1990-1994 average relative frequencies of age 3.2, 3.3, and 3.4 fish for these systems were 43.1% for the Karluk early run escapement, 2.5% for Red River, 2.5% for Frazer, 0.7% for Upper Station, and 0.2% for Uganik (Figure 5).

Late run age composition estimates relied on length-at-age frequency distribution to assign ocean ages during 1987-1991 and 1993-1994. Late run sockeye escapements to Karluk show the age 3.2 and 3.3 combined contribution ranging from 8.1% (1989) to 66.2% (1992). The Uganik, Upper Station and Frazer escapements each had less than 6% age 3.2 and 3.3 fish for the same years. The contribution of age 3.2 and 3.3 sockeye to the Red River escapement was 2% or less for all years except 1987 (17.7%; Tables 3 and 4). The 1990-1994 average relative frequencies of age 3.2 and 3.3 fish post 21 July were 40% for the Karluk late run escapement, 2.6% for Red River, 1.6% for Upper Station, 1.6% for Frazer, and 0.2% for Uganik escapements (Figure 6). The Uganik escapements were not sampled with the same frequency as the other systems.

Estimated age compositions of Kodiak westside commercial catches in Uganik and Uyak Bays confirm the presence of age 3. sockeye in both the early and late run periods from 1985 to 1994 (Tables 5-8; Figures 7-8). The age 3. components of catches from Uyak and Uganik Bays through 15 July were less than 10% from 1985 through 1991. The age 3. component increased to greater than 15% of the catch in following years with a similar pattern evident in the Karluk early run escapement (Figure 7). The proportions of age 3. fish caught in Uyak and Uganik Bays post 15 July show a substantial increase from 1990 to 1993 commensurate with the increase in

the age 3. component of the Karluk late run escapement. The relative frequency of age 3. fish within the catch in 1994 fell between 5% and 11% (Figure 8).

Karluk escapements have averaged 819,801 fish during the study period (excluding 1989), and the early and late runs combined have produced an estimated average annual harvest of 518,347 sockeye salmon (114,730 early run; 403,617 late run) in the Kodiak westside fisheries between Raspberry Cape and Sturgeon Head (Table 9). The estimated total run from 1985 through 1994 has averaged 1.3 million fish with the late run accounting for about 70% of the total.

Typically during late June and July, Karluk sockeye salmon are not dominant in the westside Kodiak catch. For example, the 1992, 1993, and 1994 weekly catch contribution estimates for Uyak Bay indicate that the late June and July catch primarily consisted of other (non-Karluk) sockeye stocks (Figures 9-11). Post July during 1992 and 1993, Karluk fish dominated the catch; in 1994 Karluk fish were a minority in the post July catch due to the rather large return of a recently developed sockeye run to Spiridon Lake (Nelson and Barrett 1994).

Early Run and Returns

For the 10-year period of 1985-1994, the estimated early Karluk sockeye run has averaged 388,672 fish (228,218 to 543,258; Table 9). Dominant ages within these runs have been 2.2, 2.3, 3.2, and 3.3 fish (Table 10).

The 1980-1988 early run sockeye escapements into Karluk have produced runs averaging 400,214 fish ranging from 261,977 to 574,387 fish (Table 11). The average return-per-spawner (R/S) for this period is estimated at 2.1 (range: 0.9 to 5.0) from an average parent year escapement of 242,569 fish (97,937 to 358,756).

The early run return-per-spawner values for brood years 1980-1988 show two production levels (Table 11). The escapements with greater than 200,000 fish have had low returns or below average return-per-spawner values (0.9-1.9), while the escapements below 150,000 have return-per-spawner values (3.1-5.0) in excess of the values for systems managed at or near optimum production (2.6; Chapman 1986).

Late Run and Returns

For the 10-year period of 1985-1994, the estimated Karluk late run has averaged 926,873 fish (range: 410,029 - 1,929,796; Table 9). During this period, age 2.2, 2.3, 3.2, and 3.3 fish were dominant (Table 12).

The 1980-1988 escapements of Karluk late run fish have produced an estimated average return of 952,489 fish (range: 463,075 - 1,838,274; Table 13). During this period, the escapements have ranged from a mere 14,227 fish in 1980 to a high of 679,260 fish in 1985, and have averaged 270,609 fish.

Late run R/S estimates for the 1980-1988 period, range from a low of about 1.6:1 for the 1987 brood year to a high of 67.6:1 for the 1980 brood year (Table 13). Excluding 1980 and 1982

values due to less than 100,000 fish escapements, the R/S range is 1.6:1 (1987) to 8.4:1 (1984), with an average of 3.7:1. The escapements in the 200-300 thousand range have averaged 2.2:1 R/S and in the 400,000 to 700,000 fish range 2.6:1 R/S.

DISCUSSION

In recent years (1992 to 1994), the early run has provided substantial fishing time for permit holders (D. Prokopowich, Alaska Department of Fish and Game, Kodiak, personal communication). Although the late run escapement goal has been met since 1985, recent year catches have been somewhat sporadic and less than expected (Figures 12-13). The variation of sockeye stock composition between weeks, months, and years as defined for Uyak Bay from 1992-1994 alone illustrates the continued necessity for conducting westside Kodiak stock separation (Figures 9-11). Without accurate catch assignment, fishery and escapement goal evaluations and forecasting are seriously compromised.

We suspect that for most of the early years (pre 1985) there were substantial errors in the assignment of westside catch to the Karluk system. In particular, the Karluk "middle" run may have developed at the expense of other local and non-local sockeye stocks contributing to the harvest. Although this may have been the best approach for that period, catch estimates founded upon these limited tagging experiments should be used with discretion.

The Karluk early and late run catch apportionment using the age 3. marker is not without error. In a study using age 0. and 3. markers conducted during July 1992 and 1993, when the proportions of age 3. fish in the catches were substantially lower than those reported herein, the 90% confidence intervals were about $\pm 35\%$ (Swanton and Nelson 1994.) We feel that this would be the maximum error one would expect for any of the yearly catch estimates presented. A variance estimator for this methodology is presently being refined.

The effects of lake fertilization conducted at Karluk Lake from 1986-1990 by the Alaska Department of Fish and Game Division of Fisheries Rehabilitation, Enhancement and Development (White 1991) coupled with escapement goal adjustments made in 1992 cannot be fully evaluated until recruitment is complete (1997-1999).

Return-per-spawner estimates do not take into account the early and late run rearing interaction. Nutrient loading from carcasses and competition for food are two factors that should be fully addressed prior to escapement goal revisions and caution should be exercised.

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Table 1. Percent age composition of sockeye salmon escapements from select systems, through 21 July 1985-1994.^a

Year	System	Sample Size	Ages																				
			0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	4.1	2.4	3.3	4.2	3.4	4.3	4.4	Total
1985																							
	Karluk	1,131	0.0	0.0	0.4	0.0	2.5	5.9	0.0	3.4	55.6	1.3	0.0	14.6	13.2	0.0	0.0	3.2	0.0	0.0	0.0	0.0	100.0
	Uganik	478	0.0	0.0	0.2	0.2	8.8	0.4	0.0	25.9	7.7	0.0	0.0	56.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Red River	596	0.0	0.0	0.7	0.0	41.0	0.9	0.0	26.2	26.3	0.0	0.0	4.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Upper Station	866	0.0	7.3	0.7	1.6	8.4	4.4	0.0	11.8	21.2	0.1	0.1	44.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	100.0
	Frazer	631	0.0	0.0	0.2	0.0	0.5	0.2	0.0	0.3	92.0	0.0	0.0	6.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
1986																							
	Karluk	964	0.0	0.0	0.0	0.2	1.0	1.4	0.0	0.8	58.6	0.4	0.0	21.8	12.9	0.0	0.1	2.8	0.0	0.0	0.0	0.0	100.0
	Uganik	497	0.0	0.0	0.2	0.0	16.9	0.0	0.0	56.4	6.0	0.0	0.2	19.9	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	100.0
	Red River	808	0.0	0.0	0.1	1.3	0.2	0.4	0.0	40.2	31.4	0.0	0.1	26.2	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	100.0
	Upper Station	1,183	0.0	0.1	0.6	0.5	52.9	0.4	0.0	2.0	40.0	0.0	0.0	3.4	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	100.0
	Frazer	583	0.0	0.0	0.0	0.0	13.0	0.2	0.0	1.2	4.1	0.0	0.0	79.6	0.5	0.0	0.0	1.4	0.0	0.0	0.0	0.0	100.0
1987																							
	Karluk	1,456	0.0	0.0	0.0	0.1	1.9	1.8	0.0	4.9	45.7	1.1	0.0	27.0	8.7	0.0	0.0	8.8	0.0	0.0	0.0	0.0	100.0
	Uganik	222	0.0	0.4	0.4	3.2	21.6	0.4	0.0	66.3	3.2	0.0	0.0	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Red River	1,056	0.0	0.0	4.4	0.7	6.3	5.0	0.2	6.2	34.9	0.1	0.1	40.0	1.9	0.0	0.2	0.1	0.0	0.0	0.0	0.0	100.0
	Upper Station	1,492	0.0	0.1	0.0	0.8	3.8	0.8	0.0	52.3	25.7	0.0	0.0	16.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Frazer	377	0.0	0.0	1.1	0.0	12.5	12.2	0.0	53.5	7.4	0.3	0.3	12.5	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	100.0
1988																							
	Karluk	1,430	0.0	0.0	0.0	0.0	1.2	2.7	0.0	4.3	45.1	0.6	0.0	28.1	11.1	0.0	0.1	6.9	0.0	0.0	0.0	0.0	100.0
	Uganik	418	0.0	0.7	3.1	0.0	12.9	2.2	0.0	47.4	10.3	0.0	0.0	23.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Red River	1,260	0.0	0.0	12.9	0.7	22.0	13.7	0.0	14.9	19.5	0.1	0.2	14.8	0.4	0.0	0.1	0.8	0.0	0.0	0.0	0.0	100.0
	Upper Station	1,567	0.0	1.7	0.0	3.3	1.8	0.1	0.0	8.5	70.4	0.0	0.3	13.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Frazer	873	0.0	0.0	0.0	0.0	1.2	6.3	0.0	3.0	84.1	0.2	0.2	2.5	2.3	0.0	0.0	0.2	0.0	0.0	0.0	0.0	100.0
1989																							
	Karluk	1,394	0.0	0.0	0.0	0.0	1.2	0.8	0.0	1.7	27.9	0.2	0.0	52.6	9.7	0.0	0.0	5.9	0.0	0.0	0.0	0.0	100.0
	Uganik	309	0.0	0.0	0.6	0.6	24.3	0.0	0.0	41.8	5.2	0.0	0.0	26.6	0.6	0.0	0.0	0.3	0.0	0.0	0.0	0.0	100.0
	Red River	1,255	0.0	0.0	0.7	0.6	51.9	2.3	0.0	11.3	18.1	0.0	0.2	14.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Upper Station	1,481	0.0	0.0	3.7	2.0	2.1	17.1	0.0	1.7	37.4	0.0	0.0	35.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Frazer	893	0.0	0.1	2.0	0.0	1.5	0.1	0.0	1.0	23.5	0.0	0.0	71.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
1990																							
	Karluk	1,424	0.0	0.2	0.0	0.1	2.7	1.1	0.0	1.7	31.9	1.5	0.0	40.8	14.1	0.0	0.1	5.7	0.0	0.0	0.0	0.0	100.0
	Uganik	423	0.0	0.0	0.0	0.0	10.9	0.4	0.0	27.1	23.5	0.0	0.0	37.2	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	100.0
	Red River	1,319	0.0	0.0	1.3	8.5	8.0	1.7	0.3	50.0	26.0	0.0	0.3	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Upper Station	1,879	0.0	1.3	0.0	0.3	31.5	0.6	0.0	4.1	53.4	0.0	0.0	8.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Frazer	866	0.0	0.0	0.1	0.0	73.0	4.0	0.0	5.3	5.7	0.0	0.0	7.5	0.3	0.0	0.0	4.1	0.0	0.0	0.0	0.0	100.0
1991																							
	Karluk	1,215	0.0	0.0	0.0	0.5	0.4	1.2	0.1	2.4	32.2	1.7	0.0	32.6	21.4	0.0	0.3	7.1	0.0	0.0	0.0	0.1	100.0
	Uganik	410	0.0	0.0	0.7	0.0	4.7	2.4	0.0	47.2	16.5	0.0	0.0	28.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Red River	1,399	0.0	0.1	0.3	1.4	14.4	1.1	0.1	43.5	22.2	0.0	0.4	16.4	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	100.0
	Upper Station	1,455	0.0	0.0	0.0	1.4	1.7	1.1	0.0	24.7	42.3	0.1	0.0	28.6	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	100.0
	Frazer	1,077	0.0	0.0	0.7	0.0	0.1	9.2	0.0	15.6	73.7	0.0	0.0	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0

- Continued -

Table 1. (page 2 of 2)

Year	System	Sample Size	Ages																				Total	
			0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	4.1	2.4	3.3	4.2	3.4	4.3	4.4		
1992																								
	Karluk	1,188	0.0	0.0	0.6	0.0	1.6	2.5	0.0	1.6	22.0	7.7	0.0	24.8	26.6	0.0	0.4	12.0	0.3	0.0	0.0	0.0	100.0	
	Uganik	605	0.0	0.0	1.9	0.0	9.1	0.0	0.0	23.0	29.2	0.0	2.1	34.5	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	100.0	
	Red River	972	0.0	0.0	0.6	0.6	10.4	0.2	0.0	13.7	38.7	0.7	0.0	33.8	0.8	0.0	0.0	0.3	0.0	0.1	0.0	0.0	100.0	
	Upper Station	1,248	0.0	1.0	2.1	0.2	0.2	4.5	0.0	1.7	70.0	0.1	0.0	18.9	0.8	0.0	0.4	0.1	0.0	0.0	0.0	0.0	100.0	
	Frazer	840	0.0	0.0	5.9	0.0	4.6	2.8	0.0	0.7	42.8	0.0	0.0	39.9	2.3	0.0	0.3	0.7	0.0	0.0	0.0	0.0	100.0	
1993																								
	Karluk	1,593	0.0	0.0	0.0	0.0	1.5	0.8	0.0	1.8	15.4	1.5	0.1	8.0	59.4	0.0	0.1	10.9	0.4	0.0	0.0	0.0	100.0	
	Uganik	347	0.0	0.3	0.0	0.0	18.7	0.0	0.0	30.3	19.0	0.0	0.0	31.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	
	Red River	1,550	0.0	0.0	0.1	0.7	2.9	3.6	0.0	7.9	15.4	0.0	0.0	61.3	5.9	0.0	0.2	1.9	0.0	0.0	0.0	0.0	100.0	
	Upper Station	1,426	0.0	1.5	1.7	6.0	8.8	18.6	0.0	1.6	35.7	0.6	0.0	24.3	0.8	0.0	0.0	0.4	0.0	0.0	0.0	0.0	100.0	
	Frazer	1,293	0.0	0.0	0.3	0.1	45.8	4.1	0.0	4.4	26.1	0.0	0.0	18.3	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	100.0	
1994																								
	Karluk	1,561	0.0	0.0	0.4	0.0	4.0	0.9	0.0	3.1	23.1	1.7	0.0	8.2	49.4	0.1	0.2	8.7	0.3	0.1	0.0	0.0	100.0	
	Uganik	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Red River	1,439	0.0	0.1	8.4	2.8	0.8	5.2	0.1	5.0	67.2	0.7	0.0	6.3	1.6	0.0	0.0	1.7	0.0	0.0	0.0	0.0	100.0	
	Upper Station	1,311	0.1	1.3	8.9	0.3	6.0	8.8	0.0	5.1	61.9	0.0	0.2	6.4	1.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	100.0	
	Frazer	1,247	0.0	0.0	0.3	0.0	1.9	5.9	0.0	23.8	52.6	3.1	0.0	8.6	3.6	0.0	0.0	0.2	0.0	0.0	0.0	0.0	100.0	

* Percent age composition was derived using escapement numbers after rounding. These numbers were calculated by age and day using linear interpolation between weekly sampling events. When escapement occurs prior to the first sample or after the last sample calculations are based on the adjacent sample.

Table 2. Estimated age composition of sockeye salmon escapements from select systems, in number of fish, through 21 July 1985-1994.

Year	System	Sample Size	Ages																				Total
			0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	4.1	2.4	3.3	4.2	3.4	4.3	4.4	
1985																							
	Karluk	1,131	0	0	1,244	0	7,828	18,604	0	10,664	176,281	4,085	0	46,083	41,742	0	0	10,157	0	0	0	0	316,688
	Uganik	478	0	0	160	160	7,047	320	0	20,741	6,166	0	0	45,405	0	0	0	0	0	0	0	0	80,000
	Red River	596	0	0	2,142	0	125,442	2,754	0	80,160	80,466	0	0	14,380	612	0	0	0	0	0	0	0	305,956
	Upper Station	866	0	2,005	192	439	2,307	1,208	0	3,241	5,822	27	27	12,084	27	0	0	27	0	0	0	0	27,408
	Frazer	631	0	0	832	0	2,081	832	0	1,249	383,348	0	0	28,304	0	0	0	0	0	0	0	0	416,646
1986																							
	Karluk	964	0	0	143	632	3,503	5,127	0	2,814	210,193	1,464	0	78,327	46,112	0	487	9,954	0	0	0	0	358,756
	Uganik	497	0	0	180	0	15,225	0	0	50,721	5,405	0	180	17,928	180	0	180	0	0	0	0	0	90,000
	Red River	808	0	0	275	3,577	550	1,101	0	110,611	86,398	0	275	72,090	275	0	0	275	0	0	0	0	275,428
	Upper Station	1,183	0	100	600	500	53,033	400	0	2,001	40,025	0	0	3,402	0	0	0	100	0	0	0	0	100,163
	Frazer	583	0	0	0	0	15,555	239	0	1,436	4,906	0	0	95,244	598	0	0	1,675	0	0	0	0	119,653
1987																							
	Karluk	1,456	0	0	0	462	6,673	6,357	0	17,281	161,769	3,769	0	95,543	30,953	0	0	31,287	0	0	0	0	354,094
	Uganik	222	0	280	280	2,242	15,135	280	0	46,386	2,242	0	0	3,153	0	0	0	0	0	0	0	0	70,000
	Red River	1,056	0	0	8,093	1,287	11,567	9,196	368	11,403	64,189	184	184	73,569	3,495	0	368	184	0	0	0	0	184,106
	Upper Station	1,492	0	76	0	608	2,886	608	0	39,723	19,520	0	0	12,532	0	0	0	0	0	0	0	0	75,952
	Frazer	377	0	0	283	0	3,218	3,140	0	13,797	1,905	77	77	3,218	0	0	77	0	0	0	0	0	25,792
1988																							
	Karluk	1,430	0	0	0	0	3,687	8,014	0	12,820	133,735	1,650	0	83,202	32,790	0	247	20,365	0	0	0	0	296,510
	Uganik	418	0	168	744	0	3,096	528	0	11,376	2,472	0	0	5,616	0	0	0	0	0	0	0	0	24,000
	Red River	1,260	0	0	27,477	1,491	46,860	29,181	0	31,737	41,535	213	426	31,524	852	0	213	1,704	0	0	0	0	213,214
	Upper Station	1,567	0	1,002	0	1,944	1,060	59	0	5,008	41,475	0	177	8,130	59	0	0	0	0	0	0	0	58,913
	Frazer	873	0	0	0	0	2,766	14,522	0	6,915	193,851	461	461	5,763	5,302	0	0	461	0	0	0	0	230,501
1989																							
	Karluk	1,394	0	24	0	24	4,258	2,840	0	5,830	97,537	738	0	183,829	33,945	0	0	20,728	0	0	0	0	349,753
	Uganik	309	0	0	457	457	18,505	0	0	31,756	3,960	0	0	20,160	457	0	0	228	0	0	0	0	76,000
	Red River	1,255	0	0	4,004	3,432	297,442	13,156	0	64,636	103,533	0	1,144	85,229	0	0	0	0	0	0	0	0	572,576
	Upper Station	1,481	0	0	2,390	1,292	1,356	11,044	0	1,098	24,154	0	0	23,120	129	0	0	0	0	0	0	0	64,582
	Frazer	893	0	320	6,398	0	4,799	320	0	3,199	75,180	0	0	229,378	0	0	0	0	0	0	0	0	319,594
1990																							
	Karluk	1,424	0	376	0	275	5,372	2,159	0	3,427	62,580	2,953	0	79,957	27,699	0	275	11,124	0	0	0	0	196,197
	Uganik	423	0	0	0	0	5,993	220	0	14,900	12,921	0	0	20,453	0	0	495	0	0	0	0	0	54,981
	Red River	1,319	0	0	2,649	17,322	16,303	3,464	611	101,894	52,985	0	611	7,948	0	0	0	0	0	0	0	0	203,788
	Upper Station	1,679	0	730	0	168	17,690	337	0	2,303	29,989	0	0	4,886	56	0	0	0	0	0	0	0	56,159
	Frazer	866	0	0	180	0	131,718	7,208	0	9,550	10,271	0	0	13,514	541	0	0	7,388	0	0	0	0	180,369
1991																							
	Karluk	1,215	0	0	0	1,301	856	2,884	309	5,757	78,355	4,031	0	79,169	51,958	0	811	17,352	0	0	0	286	243,116
	Uganik	410	0	0	556	0	3,736	1,908	0	37,516	13,115	0	0	22,653	0	0	0	0	0	0	0	0	79,483
	Red River	1,399	0	325	975	4,550	46,800	3,575	325	141,374	72,149	0	1,300	53,300	0	0	325	0	0	0	0	0	324,997
	Upper Station	1,455	0	0	0	700	850	550	0	12,344	21,140	50	0	14,293	50	0	0	50	0	0	0	0	50,026
	Frazer	1,077	0	0	1,331	0	190	17,495	0	29,666	140,344	0	0	190	1,141	0	0	0	0	0	0	0	190,358
1992																							
	Karluk	1,188	0	0	1,378	0	3,498	5,353	0	3,453	47,728	16,750	27	53,780	57,742	0	813	25,988	642	0	0	0	217,152
	Uganik	605	0	0	1,369	0	6,558	0	0	16,576	21,044	0	1,513	24,864	0	0	72	72	0	0	0	0	72,069
	Red River	972	0	0	1,499	1,499	25,987	500	0	34,232	96,700	1,749	0	84,456	1,999	0	0	750	0	250	0	0	249,621
	Upper Station	1,248	0	191	401	38	38	859	0	325	13,347	19	0	3,609	153	0	76	19	0	0	0	0	19,076
	Frazer	840	0	0	8,399	0	6,548	3,986	0	996	60,927	0	0	56,798	3,274	0	427	996	0	0	0	0	142,352

- Continued -

Table 2. (page 2 of 2)

Year		Ages																					
System	Sample Size	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	4.1	2.4	3.3	4.2	3.4	4.3	4.4	Total	
1993																							
Karluk	1,593	0	0	111	0	4,046	2,211	0	4,625	40,173	3,984	198	20,987	155,021	0	228	28,417	1,100	38	30	0	261,167	
Uganik	347	0	190	0	0	12,363	0	0	19,971	12,553	0	0	20,542	380	0	0	0	0	0	0	0	66,000	
Red River	1,550	0	0	292	1,485	6,101	7,616	0	16,793	32,482	91	0	129,478	12,451	0	491	3,989	0	0	0	0	211,266	
Upper Station	1,426	0	521	578	2,026	2,992	6,295	0	555	12,081	210	0	8,215	257	0	0	124	0	0	0	0	33,860	
Frazer	1,293	0	0	401	195	68,214	6,164	0	6,528	38,808	17	0	27,323	0	0	0	1,315	0	0	0	0	148,965	
1994																							
Karluk	1,561	0	0	981	0	10,447	2,228	0	8,047	60,191	4,422	0	21,354	128,710	285	545	22,627	660	176	95	0	260,771	
Uganik	0																						
Red River	1,439	0	234	22,524	7,383	2,116	13,944	172	13,441	179,521	1,918	0	16,950	4,329	0	31	4,619	0	0	0	0	267,184	
Upper Station	1,311	52	530	3,568	104	2,385	3,505	0	2,043	24,795	0	72	2,554	416	0	0	31	0	0	0	0	40,056	
Frazer	1,247	0	0	484	0	2,929	9,101	0	36,529	80,649	4,794	0	13,185	5,448	0	0	265	0	0	0	0	153,384	

Table 3. Percent age composition of sockeye salmon escapements from select systems post 21 July 1985-1994.^a

Year	System	Sample Size	Ages																	Total
			0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	4.2	4.3	
1985	Karluk	1,205	0.0	0.0	0.0	0.0	0.6	1.9	0.0	0.1	69.9	0.7	0.0	6.4	19.8	0.0	0.6	0.0	0.0	100.0
	Red River	211	0.0	0.0	0.0	0.0	13.7	0.0	0.0	29.9	53.1	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	100.0
	Upper Station	1,646	0.5	69.2	0.6	1.9	16.9	1.3	0.0	2.3	6.0	0.0	0.1	1.2	0.0	0.0	0.0	0.0	0.0	100.0
	Frazer	215	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	95.3	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	100.0
1986	Karluk	419	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	48.7	0.5	0.0	18.9	19.6	0.0	12.2	0.0	0.0	100.0
	Red River ^b	841	0.0	0.0	0.0	0.0	0.4	0.1	0.0	2.4	88.8	0.0	0.0	6.9	1.4	0.0	0.0	0.0	0.0	100.0
	Upper Station	1,543	0.2	13.1	0.0	23.3	26.2	0.4	0.1	10.7	24.8	0.0	0.0	1.2	0.1	0.0	0.0	0.0	0.0	100.0
	Frazer	384	0.0	0.0	0.2	0.0	25.8	0.0	0.0	0.2	6.7	0.0	0.0	66.9	0.2	0.0	0.0	0.0	0.0	100.0
1987	Karluk	1,630	0.0	0.2	0.0	0.7	0.7	3.1	0.0	0.9	49.3	0.1	0.0	32.0	7.2	0.2	5.6	0.0	0.0	100.0
	Red River	684	0.0	0.0	0.9	0.0	4.4	3.4	0.0	3.7	28.2	0.1	0.0	41.7	16.4	0.0	1.3	0.0	0.0	100.0
	Upper Station	1,605	0.4	7.0	0.1	25.0	4.3	0.3	0.0	17.2	42.9	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	100.0
	Frazer	491	0.0	0.0	3.1	0.2	13.4	25.7	0.0	43.4	6.9	0.0	0.0	6.7	0.0	0.2	0.4	0.0	0.0	100.0
1988	Karluk	1,016	0.0	0.0	0.0	0.0	0.1	2.0	0.0	0.1	58.7	0.4	0.0	26.9	7.5	0.0	4.3	0.0	0.0	100.0
	Red River	676	0.0	0.0	2.7	0.0	23.5	12.8	0.0	4.1	47.5	0.0	0.1	7.3	1.6	0.0	0.4	0.0	0.0	100.0
	Upper Station	1,683	0.1	56.2	0.2	8.9	18.7	0.5	0.0	5.3	9.3	0.0	0.0	0.5	0.2	0.1	0.0	0.0	0.0	100.0
	Frazer	225	0.0	0.0	0.0	0.0	1.8	26.7	0.0	1.3	63.5	2.7	0.0	0.0	3.6	0.0	0.4	0.0	0.0	100.0
1989	Karluk	1,345	0.0	0.1	0.0	0.1	4.0	0.0	0.0	4.0	55.7	0.0	0.0	28.0	5.5	0.0	2.6	0.0	0.0	100.0
	Red River	869	0.0	0.0	0.3	0.3	34.7	3.0	0.0	3.9	48.1	0.0	0.0	9.7	0.0	0.0	0.0	0.0	0.0	100.0
	Upper Station	1,521	0.0	11.4	0.3	42.3	4.8	1.8	0.0	2.9	32.3	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	100.0
	Frazer	442	0.0	0.0	6.9	0.0	1.8	0.5	0.0	1.1	39.3	0.0	0.0	50.4	0.0	0.0	0.0	0.0	0.0	100.0
1990	Karluk	1,535	0.0	0.3	0.0	0.6	0.3	0.0	0.0	1.4	49.9	0.0	0.0	33.3	9.8	0.3	4.0	0.0	0.0	100.0
	Uganik	398	0.0	0.0	0.0	1.0	13.2	0.2	0.0	31.8	26.3	0.0	0.0	26.6	1.0	0.0	0.0	0.0	0.0	100.0
	Red River	820	0.0	0.0	0.1	0.9	12.1	0.4	0.0	23.4	58.0	0.0	0.5	4.5	0.1	0.0	0.0	0.0	0.0	100.0
	Upper Station	1,491	0.0	9.6	0.1	13.3	41.1	0.8	0.0	5.7	25.3	0.0	0.0	3.3	0.7	0.0	0.2	0.0	0.0	100.0
	Frazer	861	0.0	0.0	0.3	0.0	78.2	3.6	0.0	4.5	5.3	0.0	0.0	5.0	3.1	0.0	0.0	0.0	0.0	100.0
1991	Karluk	1,733	0.0	0.2	0.0	0.9	1.4	0.2	0.0	0.8	40.3	0.1	0.0	34.0	16.5	0.0	5.6	0.0	0.0	100.0
	Uganik	195	0.0	0.0	0.0	0.2	1.4	0.0	0.0	37.7	4.9	0.0	0.0	55.6	0.0	0.2	0.0	0.0	0.0	100.0
	Red River	622	0.0	0.0	0.2	0.1	7.7	0.6	0.0	20.4	45.9	0.0	0.1	23.0	1.7	0.0	0.2	0.0	0.0	100.0
	Upper Station	1,258	0.2	1.2	0.1	15.0	1.7	0.1	0.1	15.3	59.4	0.0	0.1	6.0	0.8	0.0	0.0	0.0	0.0	100.0
	Frazer	0																		

- Continued -

Table 3. (page 2 of 2)

Year	System	Sample Size	Ages																	Total
			0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	4.2	4.3	
1992	Karluk	1,558	0.0	0.3	0.1	0.2	0.4	0.2	0.0	0.1	21.4	0.2	0.0	10.9	61.4	0.0	4.8	0.0	0.0	100.0
	Uganik	20	0.0	0.0	0.0	0.0	0.0	5.0	0.0	15.0	25.1	0.0	0.0	54.9	0.0	0.0	0.0	0.0	0.0	100.0
	Red River	499	0.0	0.0	0.0	0.2	12.0	0.7	0.0	13.4	45.4	0.0	0.0	26.2	0.9	0.9	0.4	0.0	0.0	100.0
	Upper Station	894	0.7	40.0	0.6	6.6	18.1	0.5	0.0	4.0	24.9	0.0	0.0	4.2	0.4	0.0	0.0	0.0	0.0	100.0
	Frazer	572	0.0	0.0	17.4	0.0	5.3	9.0	0.0	1.3	36.2	0.0	0.0	28.7	1.3	0.5	0.2	0.0	0.0	100.0
1993	Karluk	1,659	0.0	0.6	0.2	0.6	0.9	3.1	0.0	0.5	29.4	1.8	0.0	3.6	49.6	0.1	9.6	0.1	0.0	100.0
	Uganik	0																		
	Red River	861	0.0	0.0	0.1	0.0	5.0	6.3	0.0	6.9	52.8	0.3	0.0	22.9	4.5	0.0	1.0	0.0	0.0	100.0
	Upper Station	1,013	3.6	17.9	2.1	7.2	18.1	6.4	0.0	13.4	20.9	0.1	0.1	4.8	5.2	0.0	0.4	0.0	0.0	100.0
	Frazer	615	0.0	0.0	1.9	0.0	49.9	16.8	0.0	1.7	25.7	0.1	0.0	3.8	0.1	0.0	0.0	0.0	0.0	100.0
1994	Karluk	1,412	0.0	1.1	0.0	0.9	2.5	0.4	0.0	0.5	44.5	0.8	0.0	10.3	30.1	0.0	8.5	0.3	0.3	100.0
	Uganik	0																		
	Red River	1,101	0.0	0.0	0.4	0.2	0.8	0.5	0.0	1.1	86.6	0.0	0.1	6.0	4.2	0.0	0.2	0.0	0.0	100.0
	Upper Station	1,403	2.2	17.4	1.8	22.7	5.8	3.1	0.0	13.4	32.4	0.1	0.0	0.7	0.3	0.0	0.0	0.0	0.0	100.0
	Frazer	427	0.0	0.0	0.1	0.0	3.9	3.6	0.0	20.0	57.5	0.1	0.0	13.0	1.6	0.1	0.0	0.0	0.0	100.0

^aPercent age composition was derived using escapement numbers after rounding. These numbers were calculated by age and day using linear interpolation between weekly sampling events. When escapement occurs prior to the first sample calculations are based on the adjacent sample.

^b Sampled from the commercial catch of the terminal statistical area.

Table 4. Estimated age composition of sockeye salmon escapements from select systems, in number of fish, post 21 July 1985-1994.

Year	System	Sample Size	Ages																	Total
			0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	4.2	4.3	
1985	Karluk	1,205	0	0	0	0	4,114	13,129	0	342	475,175	4,476	0	43,173	134,534	0	4,317	0	0	676,260
	Red River	211	0	0	0	0	11,344	0	0	24,758	43,968	0	0	2,732	0	0	0	0	0	82,803
	Upper Station	1,646	2,042	282,619	2,450	7,760	69,021	5,309	0	9,393	24,505	0	408	4,901	0	0	0	0	0	408,409
	Frazer	215	0	0	346	0	0	0	0	0	65,937	0	0	2,906	0	0	0	0	0	69,189
1986	Karluk	419	0	0	0	0	0	1,261	0	0	257,271	2,521	0	99,630	103,414	0	64,318	0	0	528,415
	Red River *	841	0	0	0	0	171	43	0	1,025	37,924	0	0	2,947	598	0	0	0	0	42,707
	Upper Station	1,543	732	47,927	0	85,244	95,854	1,463	366	39,147	90,732	0	0	4,390	366	0	0	0	0	366,222
	Frazer	384	0	0	14	0	1,772	0	0	14	462	0	0	4,600	14	0	0	0	0	6,876
1987	Karluk	1,630	169	623	0	2,867	2,881	12,664	0	3,650	203,293	585	0	131,824	29,750	841	23,010	0	0	412,157
	Red River	684	0	0	700	0	3,420	2,643	0	2,876	21,920	78	0	32,413	12,748	0	1,010	0	0	77,807
	Upper Station	1,605	626	10,950	156	39,108	6,727	469	0	26,906	67,109	0	0	4,224	0	0	0	0	0	156,274
	Frazer	491	0	0	457	30	1,977	3,791	0	6,402	1,018	0	0	988	0	30	59	0	0	14,752
1988	Karluk	1,016	0	0	0	0	306	5,641	0	332	165,580	1,072	0	76,018	21,125	0	12,232	0	0	282,306
	Red River	676	0	0	2,121	0	18,462	10,056	0	3,221	37,316	0	79	5,735	1,257	0	314	0	0	78,560
	Upper Station	1,683	248	139,069	496	22,063	46,356	1,239	0	13,138	23,054	0	0	1,239	496	248	0	0	0	247,647
	Frazer	225	0	0	0	0	291	4,322	0	210	10,295	437	0	0	583	0	65	0	0	16,203
1989	Karluk	1,345	106	893	0	1,084	29,999	212	0	30,333	422,089	0	31	212,569	41,994	0	19,583	0	0	758,893
	Red River	869	0	0	587	587	67,847	5,866	0	7,625	94,048	0	0	18,966	0	0	0	0	0	195,525
	Upper Station	1,521	0	25,274	665	93,782	10,642	3,991	0	6,429	71,611	0	0	9,312	0	0	0	0	0	221,706
	Frazer	442	0	0	2,811	0	733	204	0	448	16,010	0	0	20,573	0	0	0	0	0	40,779
1990	Karluk	1,535	0	1,477	0	3,489	1,798	267	0	7,419	270,379	176	0	180,536	53,293	1,448	21,609	0	0	541,891
	Uganik	398	0	0	0	106	1,394	21	0	3,358	2,777	0	0	2,809	106	0	0	0	0	10,570
	Red River	820	0	0	167	1,506	20,247	669	0	39,154	97,217	0	837	7,530	167	0	0	0	0	167,494
	Upper Station	1,491	0	19,017	198	26,346	81,415	1,585	0	11,291	50,116	0	0	6,537	1,387	0	396	0	0	198,287
1991	Karluk	1,733	0	1,773	111	7,736	11,286	1,661	0	6,312	335,452	1,162	0	283,128	136,866	234	46,249	0	0	890,970
	Uganik	195	0	0	0	20	138	0	0	3,706	482	0	0	5,456	0	20	0	0	0	9,821
	Red River	622	0	0	100	50	3,843	299	0	10,182	22,910	0	50	11,480	849	0	100	0	0	49,862
	Upper Station	1,258	485	2,911	243	36,393	4,124	243	243	37,120	144,357	0	243	14,557	1,941	0	0	0	0	242,860
1992	Karluk	1,558	0	2,067	631	1,411	2,688	1,192	0	316	131,705	1,058	0	66,761	376,592	262	29,578	0	0	614,262
	Uganik	20	0	0	0	0	0	191	0	573	959	0	0	2,102	0	0	0	0	0	3,825
	Red River	499	0	0	0	189	11,336	661	0	12,659	42,889	0	0	24,751	850	850	378	0	0	94,563
	Upper Station	894	1,390	79,427	1,191	13,105	35,941	993	0	7,943	49,443	0	0	8,340	794	0	0	0	0	198,567
1993	Karluk	1,659	0	2,213	942	2,291	3,642	12,236	0	1,927	116,606	7,036	0	14,415	196,418	347	38,015	200	0	396,288
	Uganik	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red River	861	0	0	112	0	3,764	4,689	0	5,184	39,563	262	0	17,147	3,391	30	763	0	0	74,904
	Upper Station	1,013	6,753	33,657	3,862	13,437	33,913	11,982	0	25,059	39,223	177	177	8,920	9,708	0	664	0	0	187,529
1994	Frazer	615	0	0	916	0	24,661	8,283	0	854	12,725	51	0	1,895	61	0	0	0	0	49,447

- Continued -

Table 4. (page 2 of 2)

Year	System	Sample Size	Ages																	
			0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	4.2	4.3	Total
1994	Karluk	1,412	0	6,182	266	5,330	14,396	2,533	0	2,797	261,270	4,872	0	60,208	176,597	72	49,780	1,476	1,476	587,258
	Uganik	0																		
	Red River	1,101	0	36	421	171	867	567	0	1,239	97,875	0	85	6,797	4,734	0	200	0	0	112,997
	Upper Station	1,403	4,869	38,198	4,047	49,706	12,629	6,750	0	29,348	71,018	308	91	1,534	764	0	0	0	0	219,264
	Frazer	427	0	0	47	0	2,057	1,896	0	10,552	30,312	47	0	6,875	856	47	0	0	0	52,687

^a Sampled from the commercial catch of the terminal statistical area.

Table 5. Estimated age composition (in percent) of selected westside Kodiak sockeye catches, by area, through 15 July 1985-1994.

Year	Area	Sample Size	Ages																				Total
			0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	4.1	2.4	3.3	4.2	3.4	4.3	4.4	
1985																							
	Uyak	1,259	0.0	0.0	0.0	0.4	7.4	0.0	0.0	31.7	39.9	0.0	0.2	17.0	2.1	0.0	0.0	1.4	0.0	0.0	0.0	0.0	100.0
	Uganik	338	0.0	0.2	0.4	0.5	6.9	0.2	0.0	33.2	33.9	0.0	0.5	19.4	4.5	0.0	0.0	0.4	0.0	0.0	0.0	0.0	100.0
	Karluk ^a	212	0.0	0.0	0.0	0.0	2.0	0.0	0.0	1.8	73.6	0.0	0.0	14.0	7.9	0.0	0.0	0.6	0.0	0.0	0.0	0.0	100.0
	Sturgeon ^a	195	0.0	0.0	0.0	0.0	0.9	0.0	0.0	1.7	70.6	0.0	0.0	14.0	11.3	0.0	0.0	1.5	0.0	0.0	0.0	0.0	100.0
1986																							
	Uyak	2,157	0.0	0.0	0.0	1.5	8.8	0.2	0.0	20.0	36.4	0.1	0.0	27.2	4.2	0.0	0.0	1.6	0.0	0.0	0.0	0.0	100.0
	Uganik	1,918	0.0	0.1	0.0	1.0	3.7	0.1	0.0	40.6	31.5	0.0	0.1	20.4	1.7	0.0	0.0	0.8	0.0	0.0	0.0	0.0	100.0
	Karluk	403	0.0	0.2	0.2	0.7	6.5	0.7	0.0	6.5	62.8	0.0	0.0	17.6	4.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	100.0
	Sturgeon ^a	964	0.0	0.0	0.0	0.2	1.0	0.0	0.0	0.8	59.7	0.0	0.0	22.2	13.1	0.0	0.1	2.9	0.0	0.0	0.0	0.0	100.0
1987																							
	Uyak	1,284	0.0	0.1	1.2	1.5	8.5	4.5	0.0	27.1	33.3	0.6	0.2	18.4	2.8	0.0	0.0	1.7	0.0	0.0	0.0	0.0	100.0
	Uganik	1,311	0.0	0.1	0.1	1.5	7.6	0.1	0.0	44.7	28.0	0.0	0.8	14.2	1.6	0.0	0.0	1.4	0.0	0.0	0.0	0.0	100.0
	Karluk ^a	1,456	0.0	0.0	0.0	0.1	1.9	0.0	0.0	5.0	47.0	0.0	0.0	27.8	9.0	0.0	0.0	9.1	0.0	0.0	0.0	0.0	100.0
	Sturgeon ^a	210	0.0	0.0	0.0	0.1	2.4	0.0	0.0	3.7	40.5	0.0	0.0	45.9	4.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	100.0
1988																							
	Uyak	1,826	0.0	2.5	0.1	3.0	6.6	1.3	0.0	30.7	36.0	0.0	0.3	16.3	2.5	0.0	0.0	0.6	0.0	0.0	0.0	0.0	100.0
	Uganik	2,416	0.0	1.6	0.0	2.5	9.1	0.4	0.1	38.6	21.3	0.0	0.5	23.0	1.8	0.0	0.0	1.2	0.0	0.0	0.0	0.0	100.0
	Karluk ^a	193	0.0	0.0	0.0	0.0	0.5	0.0	0.0	2.2	47.3	0.0	0.0	34.3	7.5	0.0	0.0	8.2	0.0	0.0	0.0	0.0	100.0
	Sturgeon ^a	193	0.0	0.0	0.0	0.0	0.5	0.0	0.0	2.2	47.3	0.0	0.0	34.3	7.5	0.0	0.0	8.2	0.0	0.0	0.0	0.0	100.0
1989 ^b																							
	Uyak	0																					
	Uganik	0																					
	Karluk	0																					
	Sturgeon	0																					
1990																							
	Uyak	1,486	0.0	0.1	0.0	1.3	27.5	0.1	0.1	34.9	11.3	0.0	0.4	19.7	2.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	100.0
	Uganik	1,591	0.0	0.5	0.1	3.9	23.2	0.0	0.0	41.9	14.1	0.0	0.5	13.4	1.1	0.0	0.0	1.1	0.0	0.0	0.0	0.0	100.0
	Karluk ^c	0																					
	Sturgeon ^a	241	0.0	0.0	0.0	0.4	0.9	0.0	0.0	1.3	29.9	0.0	0.0	57.2	6.6	0.0	0.4	3.2	0.0	0.0	0.0	0.0	100.0
1991																							
	Uyak	999	0.0	0.1	0.0	0.9	2.6	0.0	0.1	35.1	18.6	0.0	0.7	37.8	2.6	0.0	0.4	1.0	0.0	0.0	0.0	0.0	100.0
	Uganik	1,091	0.0	0.0	0.0	0.7	2.4	0.0	0.0	38.8	25.1	0.0	0.4	28.4	3.0	0.0	0.1	1.1	0.0	0.0	0.0	0.0	100.0
	Karluk ^c	0																					
	Sturgeon ^c	0																					

- Continued -

Table 5. (page 2 of 2)

Year	Area	Sample Size	Ages																				Total
			0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	4.1	2.4	3.3	4.2	3.4	4.3	4.4	
1992																							
	Uyak	1,729	0.0	0.2	0.0	0.6	5.6	0.0	0.0	14.9	33.4	0.1	0.0	30.2	11.6	0.0	0.0	3.3	0.0	0.0	0.0	0.0	100.0
	Uganik	1,572	0.0	0.3	0.1	0.4	4.5	0.3	0.0	14.0	28.8	0.4	0.0	29.8	18.6	0.0	0.1	2.7	0.1	0.0	0.0	0.0	100.0
	Karluk	375	0.0	0.5	6.1	0.3	6.4	5.9	0.0	4.0	45.6	4.5	0.5	19.7	5.9	0.0	0.0	0.3	0.0	0.0	0.0	0.0	100.0
	Sturgeon ^a	207	0.0	0.0	0.0	0.0	1.6	0.0	0.0	3.9	23.4	0.0	0.3	30.0	30.6	0.0	0.4	9.8	0.0	0.0	0.0	0.0	100.0
1993																							
	Uyak	2,397	0.0	0.0	0.0	0.9	18.7	0.0	0.0	14.5	20.8	0.1	0.5	25.5	15.8	0.0	0.2	2.9	0.0	0.0	0.0	0.0	100.0
	Uganik	489	0.0	0.1	0.0	1.2	16.2	0.1	0.0	15.3	21.8	0.1	0.4	23.9	17.8	0.0	0.1	3.2	0.1	0.0	0.0	0.0	100.0
	Karluk	1,381	0.0	0.4	0.0	1.6	18.9	1.8	0.0	13.0	26.9	2.5	0.3	22.9	9.5	0.0	0.1	2.2	0.0	0.0	0.0	0.0	100.0
	Sturgeon ^c	0																					
1994																							
	Uyak	2,917	0.0	0.2	0.0	1.9	2.9	0.1	0.1	42.3	17.4	0.0	0.1	19.9	6.3	0.0	0.0	8.8	0.0	0.0	0.0	0.0	100.0
	Uganik	540	0.0	0.9	0.3	0.6	5.7	0.9	0.0	28.0	36.0	0.0	0.0	10.1	11.6	0.0	0.0	6.0	0.0	0.0	0.0	0.0	100.0
	Karluk	2,010	0.0	0.5	0.5	0.8	5.7	0.7	0.1	18.1	31.3	0.6	0.4	10.3	24.7	0.0	0.1	6.1	0.0	0.0	0.0	0.0	100.0
	Sturgeon ^c	0																					

^a Appropriate Karluk escapement sample (adjusted to 100% after removing age .1 fish) was used to calculate the age composition of the catch .

^b Commercial fishery closed due to Exxon Valdez oil spill.

^c No commercial catch through July 15.

Table 6. Estimated age composition (number of fish) of selected westside Kodiak sockeye catches, by area, through 15 July 1985-1994.

Year	Area	Sample Size	Ages																Total
			0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	4.2	3.4	
1985																			
	Uyak	1,259	0	0	153	3,084	0	0	13,185	16,582	0	83	7,059	857	0	582	0	0	41,583
	Uganik	338	102	224	328	4,230	102	0	20,363	20,773	0	328	11,872	2,775	0	224	0	0	61,321
	Karluk ^a	212	0	0	0	55	0	0	49	1,980	0	0	377	212	0	17	0	0	2,690
	Sturgeon ^a	195	0	0	0	6	0	0	10	424	0	0	84	68	0	9	0	0	601
1986																			
	Uyak	2,157	6	0	2,657	15,402	339	0	35,102	63,735	208	60	47,701	7,298	0	2,774	0	0	175,282
	Uganik	1,918	97	0	1,290	4,675	105	0	51,138	39,701	0	97	25,769	2,161	0	992	0	0	126,023
	Karluk	403	199	199	596	5,165	596	0	5,165	50,257	0	0	14,104	3,178	0	596	0	0	80,054
	Sturgeon ^a	964	0	0	26	128	0	0	102	7,478	0	0	2,782	1,646	13	357	0	0	12,532
1987																			
	Uyak	1,284	92	765	943	5,431	2,869	0	17,248	21,185	400	106	11,725	1,784	0	1,096	0	0	63,646
	Uganik	1,311	37	30	771	3,905	30	0	23,002	14,373	0	411	7,298	834	0	721	0	0	51,410
	Karluk ^a	1,456	0	0	66	958	0	0	2,480	23,213	0	0	13,710	4,442	0	4,490	0	0	49,358
	Sturgeon ^a	210	0	0	4	69	0	0	107	1,171	0	0	1,326	116	0	95	0	0	2,888
1988																			
	Uyak	1,826	2,203	127	2,631	5,806	1,161	0	27,018	31,731	39	291	14,338	2,194	39	507	0	0	88,088
	Uganik	2,416	1,531	11	2,402	8,603	333	86	36,651	20,198	39	480	21,815	1,670	39	1,101	0	0	94,956
	Karluk ^a	193	0	0	0	18	0	0	75	1,586	0	0	1,148	252	0	274	0	0	3,353
	Sturgeon ^a	193	0	0	0	12	0	0	51	1,076	0	0	779	171	0	186	0	0	2,275
1989																			
	Uyak	0																	0
	Uganik	0																	0
	Karluk	0																	0
	Sturgeon	0																	0
1990																			
	Uyak	1,486	44	0	807	16,559	71	84	20,995	6,769	0	223	11,851	1,195	0	1,525	0	0	60,125
	Uganik	1,591	585	106	4,531	26,821	57	57	48,518	16,316	57	634	15,477	1,287	0	1,235	0	0	115,683
	Karluk ^c	0																	0
	Sturgeon ^a	241	0	0	25	56	0	0	80	1,844	0	0	3,527	408	25	198	0	0	6,163

- Continued -

Table 6. (page 2 of 2)

Year	Area	Sample Size	Ages																Total
			0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	4.2	3.4	
1991																			
	Uyak	999	109	0	753	2,186	0	60	29,329	15,508	0	583	31,598	2,198	327	863	0	0	83,516
	Uganik	1,091	0	0	888	3,108	0	0	49,288	31,908	0	471	35,998	3,778	96	1,419	0	0	126,951
	Karluk ^c	0																	0
	Sturgeon ^c	0																	0
1992																			
	Uyak	1,729	512	0	1,246	12,164	0	57	32,253	72,486	171	106	65,478	25,129	49	7,077	0	0	216,726
	Uganik	1,572	625	311	834	10,449	625	0	32,273	66,217	992	49	68,499	42,705	162	6,158	218	0	230,117
	Karluk	375	231	2,656	115	2,772	2,541	0	1,732	19,748	1,963	231	8,546	2,541	115	115	0	0	43,308
	Sturgeon ^a	207	0	0	0	166	0	0	391	2,379	0	30	3,041	3,101	45	994	0	0	10,147
1993																			
	Uyak	2,397	158	0	3,512	70,063	158	0	54,546	78,183	317	2,016	95,449	59,132	639	10,703	158	0	375,034
	Uganik	489	0	0	16,129	28,460	0	0	160,328	42,692	0	8,538	192,585	8,538	1,898	4,743	0	0	463,912
	Karluk	1,381	1,007	0	4,126	49,980	4,832	0	34,196	70,897	6,477	714	60,368	25,135	264	5,843	0	0	263,834
	Sturgeon ^c	0																	0
1994																			
	Uyak	2,917	362	0	3,663	5,609	155	96	80,979	33,410	0	96	38,115	12,025	84	16,924	84	59	191,661
	Uganik	540	1,539	518	1,023	9,989	1,552	0	49,175	63,256	0	0	17,711	20,325	0	10,492	0	0	175,576
	Karluk	2,010	872	791	1,318	9,621	1,216	100	30,542	52,762	1,095	706	17,440	41,669	184	10,201	0	0	168,521
	Sturgeon ^c	0																	0

^a Appropriate Karluk escapement sample (adjusted to 100% after removing age .1 fish) was used to calculate the age composition of the catch .

^b Commercial fishery closed due to Exxon Valdez oil spill.

^c No commercial catch through July 15.

Table 7. Estimated age composition (in percent) of selected westside Kodiak sockeye catches, by area, post 15 July 1985-1994.

Year	Area	Sample Size	Ages																			Total
			0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	4.2	3.4	4.3	4.4	
1985	Uyak	2,477	0.0	0.4	0.0	0.1	4.7	0.0	0.0	6.9	59.6	0.0	0.0	11.7	15.4	0.0	1.1	0.0	0.0	0.0	0.0	100.0
	Uganik	1,896	0.0	0.0	0.0	0.4	2.8	0.0	0.0	11.9	55.8	0.0	0.2	14.3	13.1	0.0	1.4	0.0	0.0	0.0	0.0	100.0
	Karluk ^a	1,205	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.1	71.8	0.0	0.0	6.6	20.3	0.0	0.6	0.0	0.0	0.0	0.0	100.0
	Sturgeon ^b	0																				
1986	Uyak	2,290	0.0	0.0	0.0	0.1	2.4	0.1	0.0	4.6	69.0	0.0	0.1	11.4	11.7	0.0	0.7	0.0	0.0	0.0	0.0	100.0
	Uganik	1,998	0.0	0.2	0.0	1.0	5.8	0.1	0.0	25.7	46.1	0.0	0.2	15.5	4.9	0.0	0.5	0.0	0.0	0.0	0.0	100.0
	Karluk ^a	419	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.0	0.0	0.0	19.0	19.7	0.0	12.3	0.0	0.0	0.0	0.0	100.0
	Sturgeon ^a	419	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.0	0.0	0.0	19.0	19.7	0.0	12.3	0.0	0.0	0.0	0.0	100.0
1987	Uyak	1,879	0.0	1.1	0.0	1.5	2.8	0.2	0.0	31.9	41.4	0.0	0.4	10.2	9.5	0.1	0.9	0.0	0.0	0.0	0.0	100.0
	Uganik	2,557	0.0	0.3	0.0	2.1	3.8	0.1	0.1	43.3	30.6	0.0	0.2	14.2	4.7	0.0	0.5	0.0	0.0	0.0	0.0	100.0
	Karluk ^a	1,630	0.0	0.2	0.0	0.7	0.7	0.0	0.0	0.9	50.9	0.0	0.0	33.1	7.4	0.2	5.8	0.0	0.0	0.0	0.0	100.0
	Sturgeon ^a	211	0.0	0.1	0.0	0.5	1.8	0.0	0.0	1.7	65.9	0.0	0.0	19.8	6.0	0.0	4.3	0.0	0.0	0.0	0.0	100.0
1988	Uyak	2,418	0.0	6.4	0.0	7.0	4.8	0.4	0.0	10.7	54.6	0.1	0.3	7.7	8.0	0.0	0.1	0.0	0.0	0.0	0.0	100.0
	Uganik	2,685	0.0	2.8	0.0	2.5	6.8	0.4	0.0	24.1	40.5	0.1	0.8	14.9	6.5	0.1	0.7	0.0	0.0	0.0	0.0	100.0
	Karluk ^a	1,016	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	60.1	0.0	0.0	27.6	7.7	0.0	4.4	0.0	0.0	0.0	0.0	100.0
	Sturgeon ^b	0																				
1989	Uyak ^c	0																				
	Uganik ^c	0																				
	Karluk	0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	5.3	58.4	0.0	0.0	25.4	4.7	0.0	1.4	0.0	0.0	0.0	0.0	100.0
	Sturgeon ^c	0																				
1990	Uyak	1,999	0.0	0.3	0.0	1.1	4.9	0.0	0.0	4.7	58.5	0.0	0.1	8.6	19.4	0.0	2.3	0.0	0.0	0.0	0.0	100.0
	Uganik	2,094	0.0	0.7	0.0	1.6	3.5	0.1	0.0	7.4	50.1	0.0	0.2	11.8	22.2	0.0	2.2	0.0	0.0	0.0	0.0	100.0
	Karluk	1,057	0.0	0.5	0.0	1.3	2.8	0.1	0.1	0.6	62.4	0.2	0.0	8.9	21.2	0.0	1.9	0.0	0.0	0.0	0.0	100.0
	Sturgeon ^a	1,535	0.0	0.3	0.0	0.6	0.3	0.0	0.0	1.4	49.9	0.0	0.0	33.3	9.8	0.3	4.0	0.0	0.0	0.0	0.0	100.0

- Continued -

Table 7. (page 2 of 2)

Year	Area	Sample Size	Ages																			Total
			0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	4.2	3.4	4.3	4.4	
1991	Uyak	3,057	0.0	0.0	0.0	0.6	1.0	0.0	0.0	4.3	49.5	0.0	0.1	10.0	33.2	0.0	1.3	0.0	0.0	0.0	0.0	100.0
	Uganik	2,038	0.0	0.0	0.0	1.1	1.2	0.0	0.0	7.5	44.7	0.0	0.1	21.0	23.2	0.0	1.2	0.0	0.0	0.0	0.0	100.0
	Karluk ^a	1,733	0.0	0.2	0.0	0.9	1.4	0.0	0.0	0.8	40.4	0.0	0.0	34.1	16.5	0.0	5.6	0.0	0.0	0.0	0.0	100.0
	Sturgeon ^a	195	0.0	0.2	0.0	0.9	0.8	0.0	0.0	0.3	38.4	0.0	0.0	34.7	15.3	0.0	9.3	0.0	0.0	0.0	0.0	100.0
1992	Uyak	1,417	0.0	1.5	0.2	0.9	3.4	0.0	0.0	23.6	26.9	0.0	0.7	12.5	26.1	0.2	3.9	0.0	0.0	0.0	0.0	100.0
	Uganik	1,328	0.0	0.2	0.1	0.7	0.8	0.1	0.0	12.2	6.6	0.5	0.3	12.5	64.7	0.4	0.9	0.0	0.0	0.0	0.0	100.0
	Karluk ^a	1,558	0.0	0.3	0.0	0.2	0.4	0.0	0.0	0.1	21.5	0.0	0.0	10.9	61.6	0.0	4.8	0.0	0.0	0.0	0.0	100.0
	Sturgeon ^a	194	0.0	0.4	0.0	0.0	2.8	0.0	0.0	0.6	28.5	0.0	0.0	16.5	38.7	1.1	11.4	0.0	0.0	0.0	0.0	100.0
1993	Uyak	2,416	0.0	1.1	0.7	3.6	5.4	0.1	0.0	15.6	22.5	0.0	0.8	18.5	24.4	0.2	6.8	0.3	0.0	0.0	0.0	100.0
	Uganik	1,701	0.0	1.0	0.3	2.1	4.6	0.1	0.0	10.1	24.5	0.0	0.6	17.0	35.1	0.0	4.3	0.2	0.0	0.0	0.0	100.0
	Karluk ^b	0																				
	Sturgeon ^b	0																				
1994	Uyak	3,069	0.0	0.2	0.0	1.4	50.0	0.2	0.0	7.1	26.1	0.1	0.1	4.2	9.2	0.0	1.3	0.0	0.1	0.0	0.0	100.0
	Uganik	2,582	0.0	1.1	0.4	2.3	45.2	1.4	0.0	8.3	26.8	0.5	0.1	6.5	6.5	0.0	0.8	0.2	0.0	0.0	0.0	100.0
	Karluk	349	0.3	3.2	0.3	4.3	12.3	2.9	0.0	6.3	50.7	0.9	0.3	6.6	11.5	0.0	0.6	0.0	0.0	0.0	0.0	100.0
	Sturgeon ^d	349	0.3	3.2	0.3	4.3	12.3	2.9	0.0	6.3	50.7	0.9	0.3	6.6	11.5	0.0	0.6	0.0	0.0	0.0	0.0	100.0

^a Appropriate Karluk escapement sample (adjusted to 100% after removing age .1 fish) was used to calculate the age composition of the catch .

^b No commercial catch post July 15.

^c Commercial fishery closed due to Exxon Valdez oil spill.

^d Inner and Outer Karluk Sections catch sample used to represent Sturgeon Section catch.

Table 8. Estimated age composition (number of fish) of selected westside Kodiak sockeye catches, by area, post 15 July 1985-1994.

Year	Area	Sample Size	Ages																		Total
			0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	4.2	3.4	4.3	
1985	Uyak	2,477	0	420	0	153	5,557	0	0	8,187	70,333	0	26	13,815	18,111	26	1,322	0			117,948
	Uganik	1,896	0	0	16	229	1,781	0	0	7,529	35,194	0	95	9,047	8,291	0	909	0			63,095
	Karluk ^a	1,205	0	0	0	0	194	0	0	32	22,639	0	0	2,070	6,404	0	194	0		0	31,533
	Sturgeon ^b	0																			0
1986	Uyak	2,290	0	59	0	176	7,638	173	0	14,686	220,192	0	231	36,393	37,423	59	2,226	0	0	0	319,256
	Uganik	1,998	0	395	71	1,675	9,561	146	0	42,751	76,663	0	360	25,713	8,162	0	782	0	0	0	166,273
	Karluk ^a	419	0	0	0	0	0	0	0	0	70,424	0	0	27,331	28,343	0	17,642	0	0	0	143,740
	Sturgeon ^a	419	0	0	0	0	0	0	0	0	545	0	0	212	219	0	137	0	0	0	1,113
1987	Uyak	1,879	0	1,001	0	1,381	2,641	166	0	30,327	39,320	21	383	9,684	9,034	123	890	0	0	0	94,969
	Uganik	2,557	0	695	0	4,774	8,447	207	272	96,206	68,054	0	392	31,443	10,404	0	1,220	0	0	0	222,111
	Karluk ^a	1,630	0	4	0	13	13	0	0	17	916	0	0	594	134	4	104	0	0	0	1,798
	Sturgeon ^a	211	0	6	0	29	99	0	0	93	3,693	0	0	1,107	336	0	243	0	0	0	5,606
1988	Uyak	2,418	0	5,778	27	6,336	4,359	325	0	9,690	49,505	66	291	7,002	7,280	0	53	0	0	0	90,707
	Uganik	2,685	0	2,698	4	2,410	6,655	345	4	23,556	39,618	130	778	14,603	6,338	137	639	0	0	0	97,915
	Karluk ^a	1,016	0	0	0	0	10	0	0	10	5,840	0	0	2,676	746	0	428	0	0	0	9,710
	Sturgeon ^b	0																			0
1989	Uyak ^c	0																			0
	Uganik ^c	0																			0
	Karluk	196	0	0	0	0	167	0	0	184	2,034	0	0	883	163	0	49	0	0	0	3,480
	Sturgeon ^c	0																			0
1990	Uyak	1,999	0	1,601	201	4,992	23,369	0	0	22,255	276,510	0	290	40,771	91,962	133	10,975	0	0	0	473,059
	Uganik	2,094	0	2,607	0	6,431	13,858	552	189	29,059	196,473	0	647	46,103	87,124	154	8,713	0	0	0	391,915
	Karluk	1,057	0	795	0	2,225	4,767	159	159	953	104,876	318	0	14,937	35,594	0	3,178	0	0	0	167,960
	Sturgeon ^a	1,535	0	200	0	401	200	0	0	935	33,336	0	0	22,246	6,547	200	2,672	0	0	0	66,739
1991	Uyak	3,057	0	76	0	3,677	6,188	76	105	27,553	317,445	0	409	63,807	212,637	116	8,506	530	0	0	641,126
	Uganik	2,038	0	150	0	3,380	3,509	0	0	22,727	135,106	0	186	63,405	70,070	121	3,665	121	0	0	302,436
	Karluk ^a	1,733	0	308	0	1,386	2,155	0	0	1,232	62,043	0	0	52,344	25,402	0	8,621	0	0	0	153,492
	Sturgeon ^a	195	0	2	0	7	6	0	0	2	296	0	0	267	118	0	72	0	0	0	770
1992	Uyak	1,417	0	4,012	429	2,355	9,026	20	100	62,252	70,970	0	1,751	33,095	68,827	628	10,317	0	0	0	263,780
	Uganik	1,328	0	524	168	1,832	2,093	320	0	32,974	17,773	1,329	785	33,581	174,267	1,047	2,511	0	0	0	269,200
	Karluk ^a	1,558	0	64	0	43	83	0	0	10	4,050	0	0	2,053	11,579	8	909	0	0	0	18,798
	Sturgeon	194	0	4	0	0	32	0	0	7	319	0	0	185	434	12	128	0	0	0	1,120
1993	Uyak	2,416	0	1,945	1,175	6,166	9,237	127	0	26,993	38,761	68	1,436	31,933	42,083	342	11,694	582	42	42	172,626
	Uganik	1,701	0	2,241	772	4,862	10,667	208	0	23,182	56,404	49	1,390	39,046	80,787	39	9,893	562	0	0	230,102
	Karluk ^b	0																			
	Sturgeon ^b	0																			

- Continued -

Table 8. (page 2 of 2)

Year	Area	Sample Size	Ages																	Total	
			0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	4.2	3.4		4.3
1994																					
	Uyak	3,069	0	456	42	3,014	110,776	336	0	15,664	57,822	231	136	9,306	20,362	99	2,973	31	31	147	221,395
	Uganik	2,582	0	2,217	783	4,547	88,716	2,724	0	16,333	52,665	908	146	12,713	12,723	0	1,550	345	345	0	196,373
	Karluk	349	63	693	63	946	2,709	630	0	1,387	11,153	189	63	1,449	2,521	0	126	0	0	0	21,992
	Sturgeon ^d	349		122	11	167	479	111	0	245	1,971	33	11	256	446	0	22	0	0	0	3,887

^a Appropriate Karluk escapement sample (adjusted to 100% after removing age .1 fish) was used to calculate the age composition of the catch .

^b No commercial catch post July 15.

^c Commercial fishery closed due to Exxon Valdez oil spill.

^d Inner and Outer Karluk Sections catch sample used to represent Sturgeon Section catch.

Table 9. Karluk early and late run sockeye salmon estimates, 1985-1994.

		Year										1985-94 (excluding 1989)			
		1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1985-94 average	average	range	
Early Run															
Escapement		316,688	358,756	354,094	296,510	349,753	196,197	243,069	217,152	261,167	260,771	285,416	278,267	196,197	358,756
Catch ^a		28,325	116,193	77,156	35,235	0	32,021	28,137	246,522	282,091	186,888	103,257	114,730	28,137	282,091
Total		345,013	474,949	431,250	331,745	349,753	228,218	271,206	463,674	543,258	447,659	388,672	392,997	228,218	543,258
Late Run															
Escapement		679,260	528,415	412,157	282,306	758,893	541,891	831,970	614,262	396,288	587,258	563,270	541,534	282,306	831,970
Catch ^b		168,325	297,043	170,017	127,723	3,480	990,663	1,097,826	442,693	231,940	106,322	363,603	403,617	106,322	1,097,826
Total		847,585	825,458	582,174	410,029	762,373	1,532,554	1,929,796	1,056,955	628,228	693,580	926,873	945,151	410,029	1,929,796
Combined Runs															
Escapement		995,948	887,171	766,251	578,816	1,108,646	738,088	1,075,039	831,414	657,455	848,029	848,686	819,801	578,816	1,075,039
Catch		196,650	413,236	247,173	162,958	3,480	1,022,684	1,125,963	689,215	514,031	293,210	466,860	518,347	162,958	1,125,963
Total		1,192,598	1,300,407	1,013,424	741,774	1,112,126	1,760,772	2,201,002	1,520,629	1,171,486	1,141,239	1,315,546	1,338,148	741,774	2,201,002

^a Karluk catch estimates through 15 July using age 3. marker analysis.

^b Karluk catch estimates post 15 July using age 3. marker analysis.

Table 10. Estimated Karluk early run sockeye salmon run numbers by age class, 1985-1994.

Year	Sample Size	Ages																		Total Run	
		0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	4.2	4.3		4.4
1985	2,728	0	0	1,244	0	8,558	18,604	0	11,635	193,760	4,085	0	50,484	45,654	0	10,989	0	0	0	0	345,013
1986	5,442	0	0	143	841	4,650	5,466	0	3,735	278,831	1,672	0	103,899	60,395	641	14,673	0	0	0	0	474,949
1987	4,051	0	0	0	564	8,159	7,032	0	21,058	197,293	4,169	0	117,158	38,129	0	37,689	0	0	0	0	431,250
1988	5,672	0	0	0	0	4,090	8,393	0	14,244	149,947	1,728	0	93,560	37,079	272	22,433	0	0	0	0	331,745
1989	1,394	0	24	0	24	4,258	2,842	0	5,830	97,537	738	0	183,829	33,945	0	20,728	0	0	0	0	349,753
1990	4,501	0	427	0	337	6,152	2,201	0	3,969	72,857	3,010	0	94,258	30,589	337	14,082	0	0	0	0	228,218
1991	3,305	0	0	0	1,456	958	2,884	346	6,443	87,691	4,031	0	88,599	57,934	908	19,634	0	0	0	320	271,206
1992	4,864	0	0	1,621	0	8,383	6,297	0	8,503	114,504	19,876	94	129,381	131,218	1,955	40,331	0	1,508	0	0	463,674
1993	6,872	0	0	111	0	8,182	6,228	0	9,353	81,241	11,255	401	42,441	321,664	462	59,627	38	2,225	30	0	543,258
1994	7,028	0	0	1,224	0	18,149	2,780	0	13,979	104,564	5,517	0	37,096	202,729	285	60,244	235	744	113	0	447,659

Table 11. Karluk early run sockeye salmon estimated returns from parent escapements, in numbers of fish by age, for selected years.

Year	Escap.	Ages																		Total Return	Return/ Spawner
		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	4.2	4.3	4.4		
1976	204,037																		0		
1977	185,312															0		0	0		
1978	248,741													0	10,989	0	0	0	0	10,989 ^a	
1979	212,872									0	50,484	45,654	641	14,673	0	0	0	0	0	111,453 ^a	
1980	132,396						0	11,635	193,760	4,085	0	103,899	60,395	0	37,689	0	0	0	0	411,464	3.1
1981	97,937			0	8,558	18,604	0	3,735	278,831	1,672	0	117,158	38,129	272	22,433	0	0	0	0	489,391	5.0
1982	122,705	0	1,244	841	4,650	5,466	0	21,058	197,293	4,169	0	93,560	37,079	0	20,728	0	0	0	320	386,408	3.1
1983	215,620	0	143	564	8,159	7,032	0	14,244	149,947	1,728	0	183,829	33,945	337	14,082	0	0	0	0	414,009	1.9
1984	288,422	0	0	0	4,090	8,393	0	5,830	97,537	738	0	94,258	30,589	908	19,634	0	0	0	0	261,977	0.9
1985	316,688	0	0	24	4,258	2,842	0	3,969	72,857	3,010	0	88,599	57,934	1,955	40,331	38	1,508	30	0	277,355	0.9
1986	358,766	24	0	337	6,152	2,201	346	6,443	87,691	4,031	94	129,381	131,218	462	59,627	235	2,225	113		430,579	1.2
1987	354,094	427	0	1,456	958	2,884	0	8,503	114,504	19,876	401	42,441	321,664	285	60,244		744			574,387	1.6
1988	296,510	0	0	0	8,383	6,297	0	9,353	81,241	11,255	0	37,096	202,729							356,355 ^a	
1989	349,753	0	1,621	0	8,182	6,228	0	13,979	104,564	5,517											
1990	196,197	0	111	0	18,149	2,780															
1991	243,069	0	1,224																		
1992	217,152																				
1993	261,167																				
1994	260,771																				

^a Incomplete brood year data.

Table 12. Estimated Karluk late run sockeye salmon run numbers by age class, 1985-1994.

Year	Sample		Ages																	Total	
	Size	0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	4.2	4.3		4.4
1985	5,782	0	0	0	0	5,158	13,129	0	446	596,053	4,476	0	54,171	167,426	0	6,728	0	0	0	0	847,585
1986	4,707	0	0	0	0	0	1,261	0	0	402,872	2,521	0	156,074	177,587	0	85,143	0	0	0	0	825,458
1987	6,066	169	885	0	4,079	4,160	12,830	0	5,239	290,631	606	0	187,293	49,557	1,190	25,537	0	0	0	0	582,174
1988	6,119	0	0	0	0	445	6,246	0	480	241,803	1,268	0	110,997	34,711	0	14,077	0	0	0	0	410,029
1989	1,345	106	893	0	1,084	30,165	212	0	30,516	424,123	0	31	213,452	42,156	0	19,631	0	0	0	0	762,373
1990	6,685	0	5,976	201	15,519	39,109	978	189	60,235	784,914	494	937	303,542	271,018	2,070	47,370	0	0	0	0	1,532,554
1991	6,828	0	2,531	111	17,067	24,703	1,737	105	57,974	835,214	1,162	595	493,743	421,972	471	71,764	0	651	0	0	1,929,796
1992	5,013	0	3,555	799	2,424	4,649	1,512	0	550	226,552	2,373	0	114,862	655,219	462	43,998	0	0	0	0	1,056,955
1993	6,476	0	3,574	958	3,700	5,881	12,440	0	3,112	188,313	7,153	0	23,280	319,288	560	59,602	42	325	0	0	628,228
1994	7,412	0	7,113	340	6,292	16,995	3,241	0	3,302	308,439	6,233	0	71,078	212,649	79	54,451	145	1,600	1,623	0	693,580

Table 13. Karluk late run sockeye salmon estimated returns from parent escapements, in numbers of fish by age, for selected years.

Year	Escap.	Ages																		Total Return	Return/ Spawner	
		0.1	0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	3.4	4.2	4.3			4.4
1976	319,459																			0		
1977	366,936																0		0	0		
1978	112,194														0	6,728	0	0	0	0	6,728 ^a	
1979	248,908										0	54,171	167,426	0	85,143	0	0	0	0	0	306,739 ^a	
1980	14,227							0	446	596,053	4,476	0	156,074	177,587	1,190	25,537	0	0	0	0	961,363	67.6
1981	124,769				0	5,158	13,129	0	0	402,872	2,521	0	187,293	49,557	0	14,077	0	0	0	0	674,607	5.4
1982	41,702		0	0	0	0	1,261	0	5,239	290,631	606	0	110,997	34,711	0	19,631	0	0	0	0	463,075	11.1
1983	220,795	0	0	0	4,079	4,160	12,830	0	480	241,803	1,268	31	213,452	42,156	2,070	47,370	0	0	0	0	569,699	2.6
1984	131,846	0	885	0	0	445	6,246	0	30,516	424,123	0	937	303,542	271,018	471	71,764	0	651	0	0	1,110,598	8.4
1985	679,260	169	0	0	1,084	30,165	212	189	60,235	784,914	494	595	493,743	421,972	462	43,998	42	0	0	0	1,838,274	2.7
1986	528,415	0	893	0	15,519	39,109	978	105	57,974	835,214	1,162	0	114,862	655,219	560	59,602	145	325	1,623	0	1,783,290	3.4
1987	412,157	106	5,976	201	17,067	24,703	1,737	0	550	226,552	2,373	0	23,280	319,288	79	54,451		1,600			677,963	1.6
1988	282,306	0	2,531	111	2,424	4,649	1,512	0	3,112	188,313	7,153	0	71,078	212,649							493,531 ^a	
1989	758,893	0	3,555	799	3,700	5,881	12,440	0	3,302	308,439	6,233										344,349 ^a	
1990	541,891	0	3,574	958	6,292	16,995	3,241															
1991	831,970	0	7,113	340																		
1992	614,262																					
1993	396,288																					
1994	587,258																					

^aIncomplete brood year data.

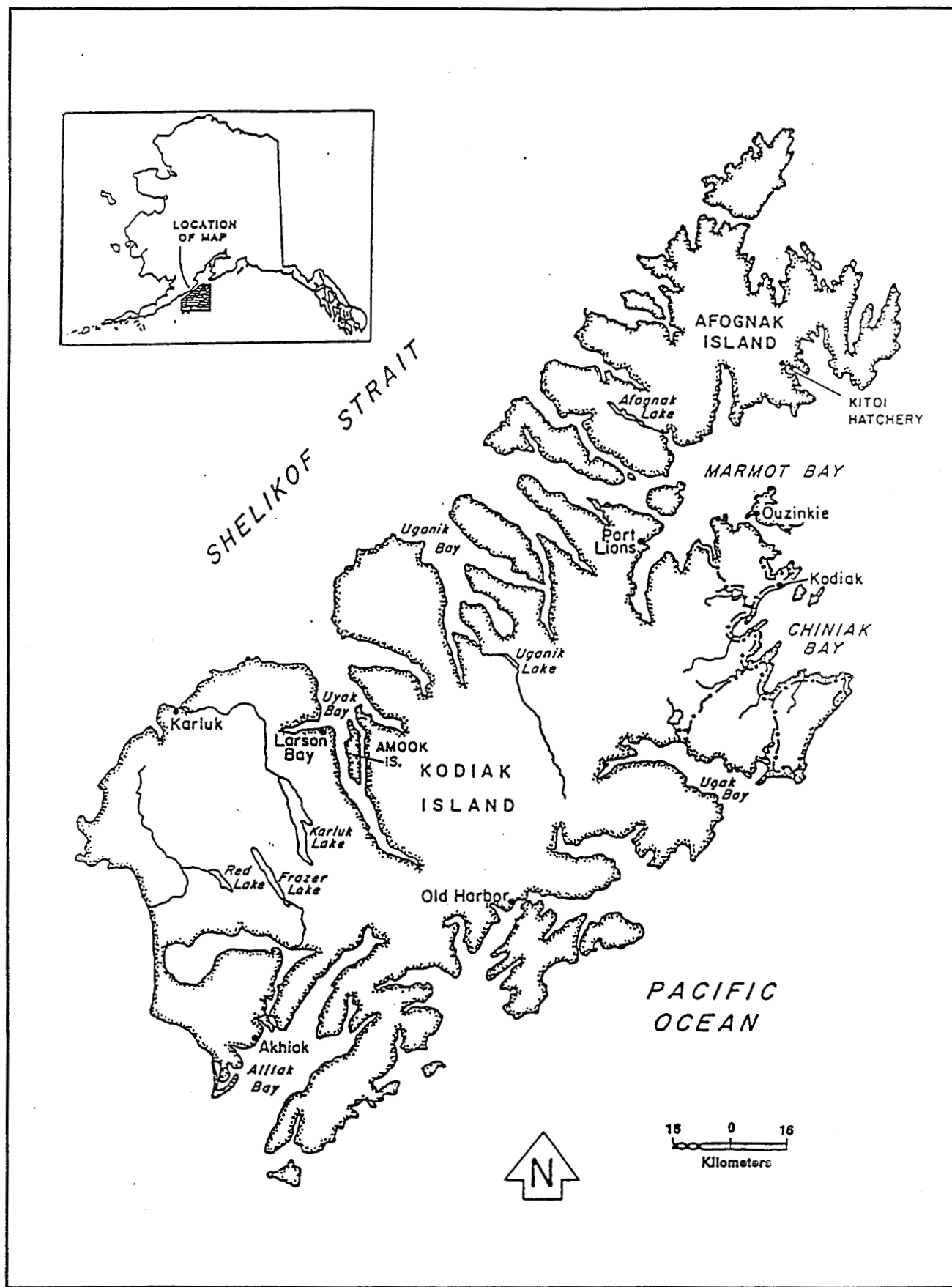


Figure 1. Map of Kodiak Island, identifying the location of the Karluk River drainage.

Figure 2. Map showing the Northwest and Southwest Kodiak Districts and Sections from Raspberry Cape south to Sturgeon Head.

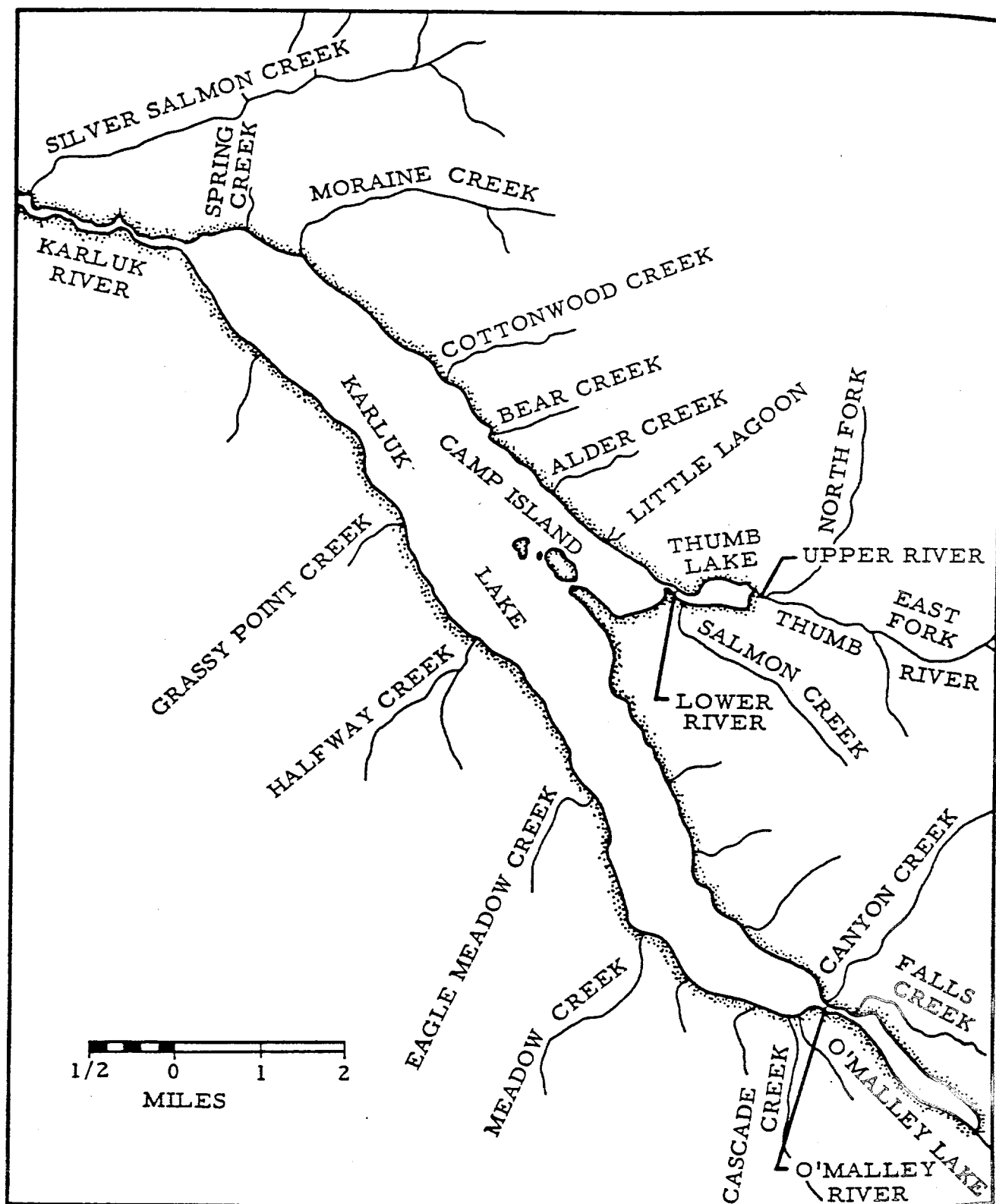


Figure 3. Karluk River drainage, Kodiak Island, Alaska.

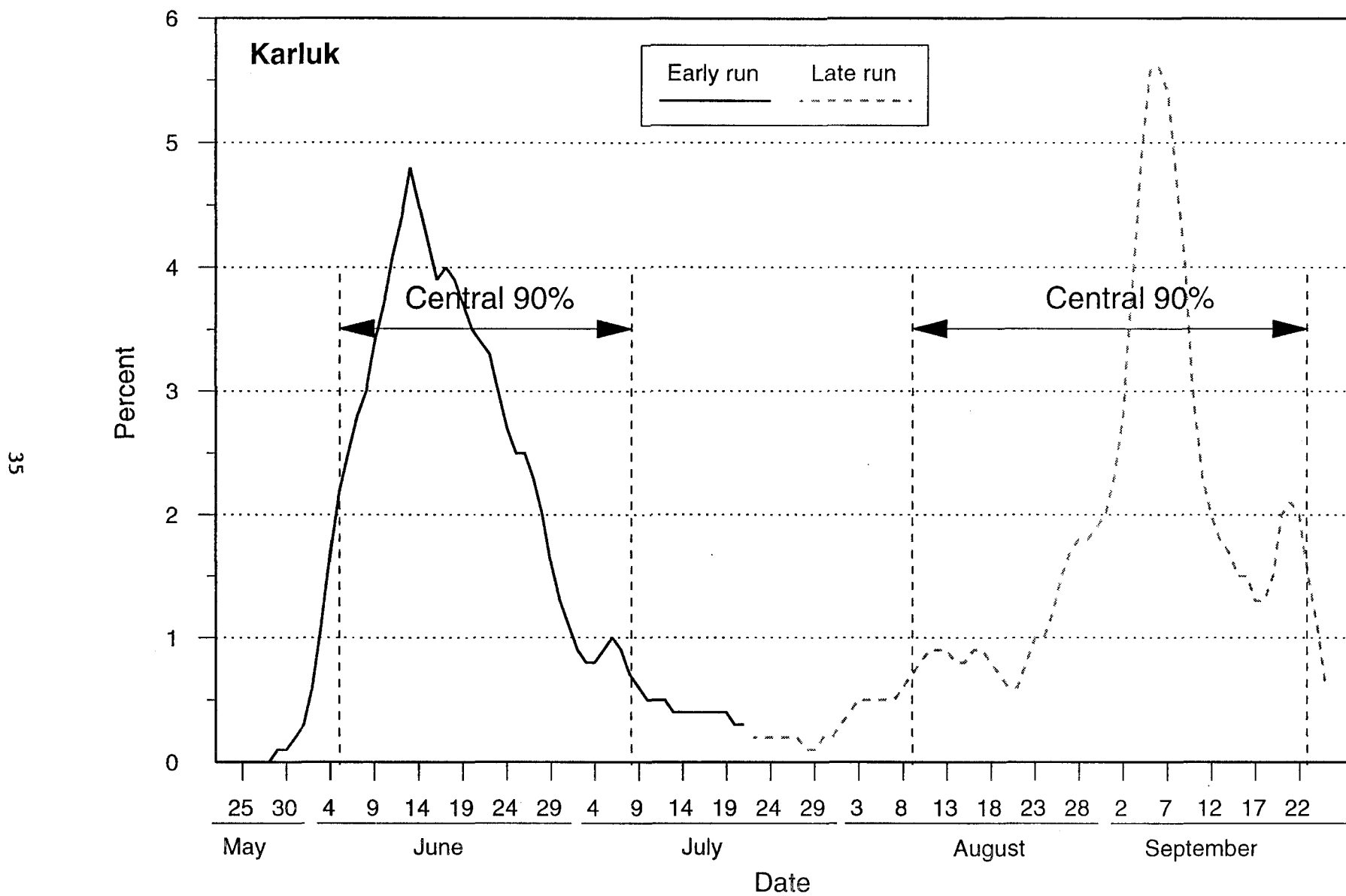


Figure 4. Estimated Karluk early and late run sockeye salmon escapement timing, 1983-1994.

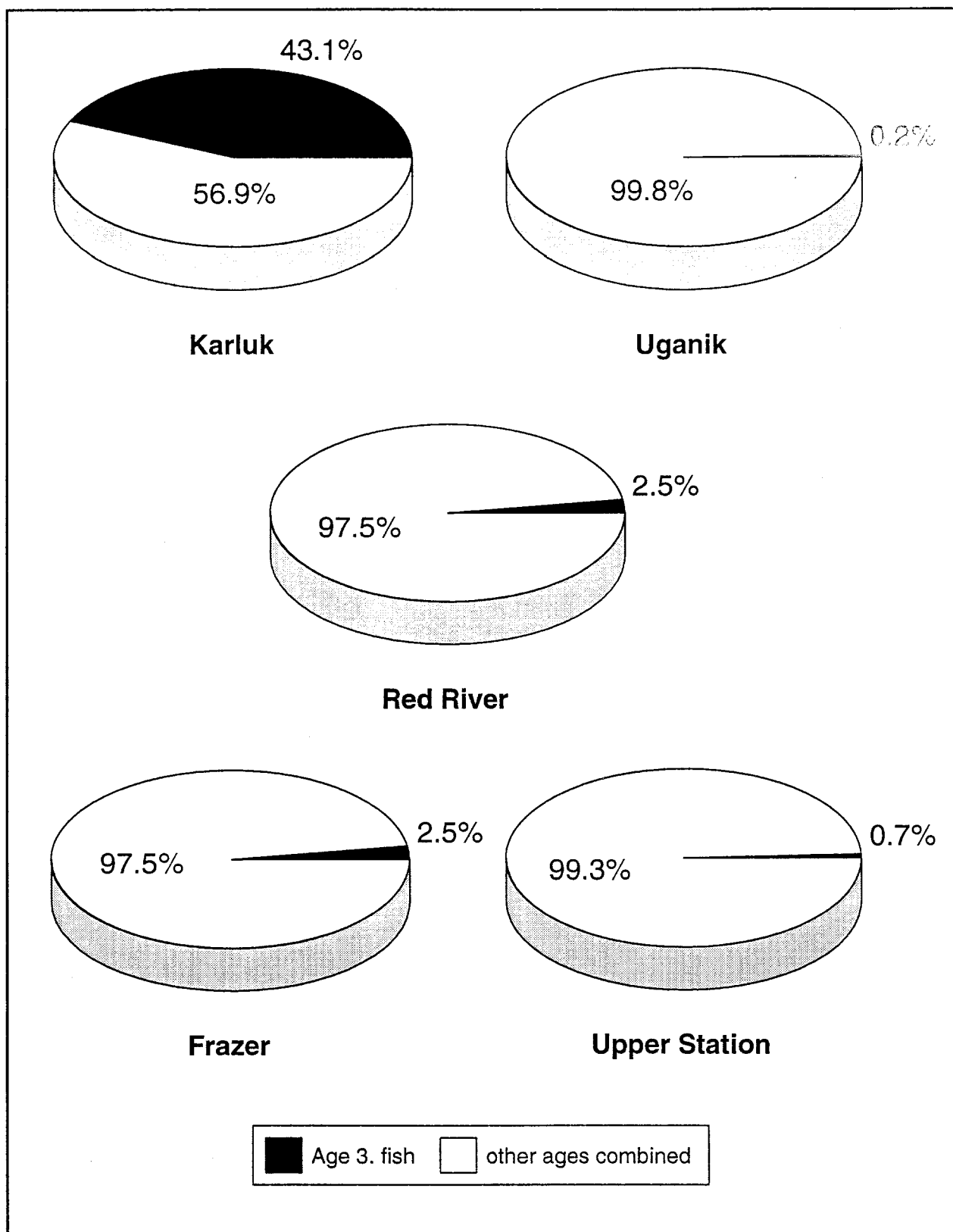


Figure 5. Average percent age 3. (3.2, 3.3, 3.4) fish from selected escapements through 21 July, 1990 through 1994.

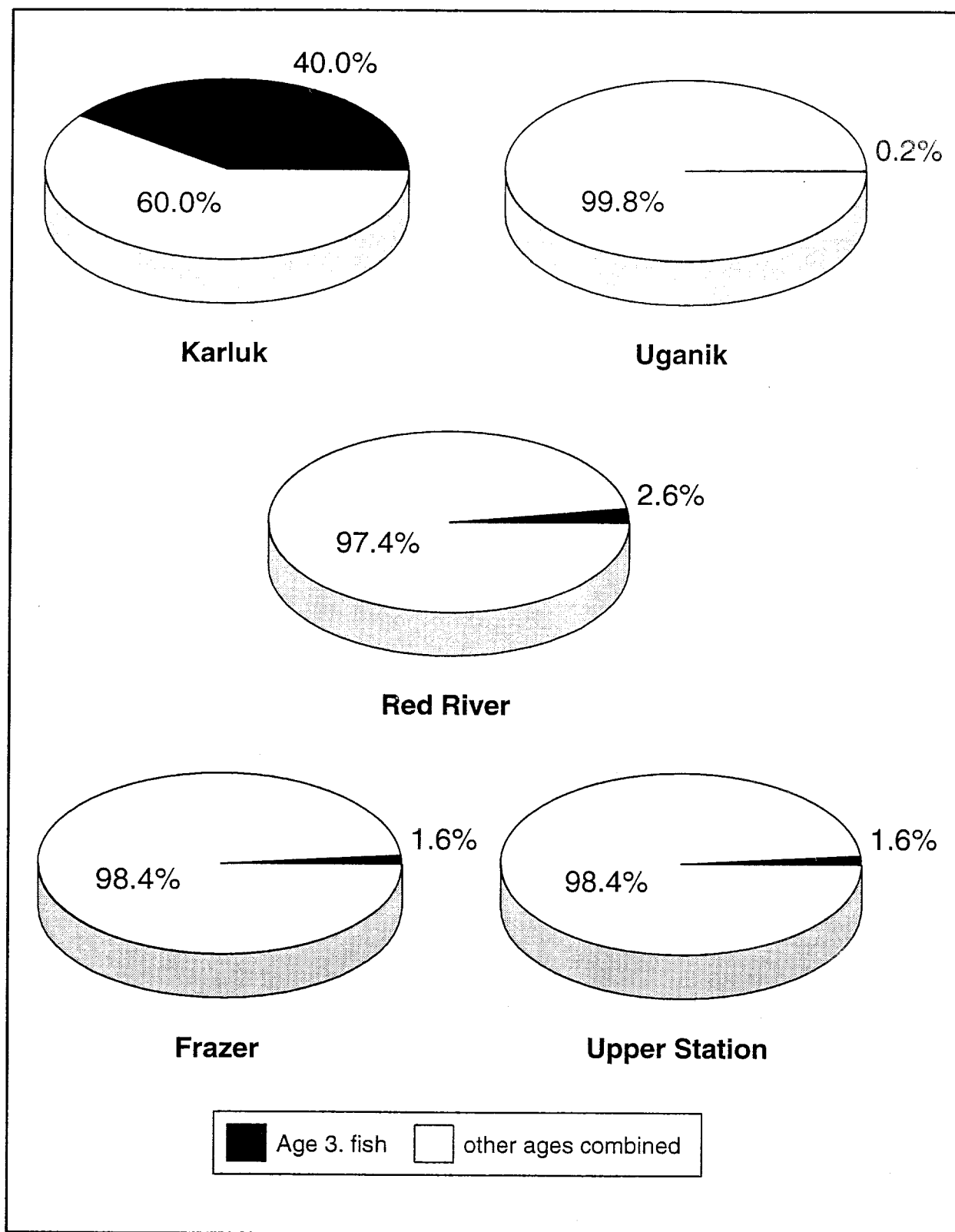


Figure 6. Average percent age 3. (3.2, 3.3, 3.4) fish from selected escapements post 21 July, 1990 through 1994.

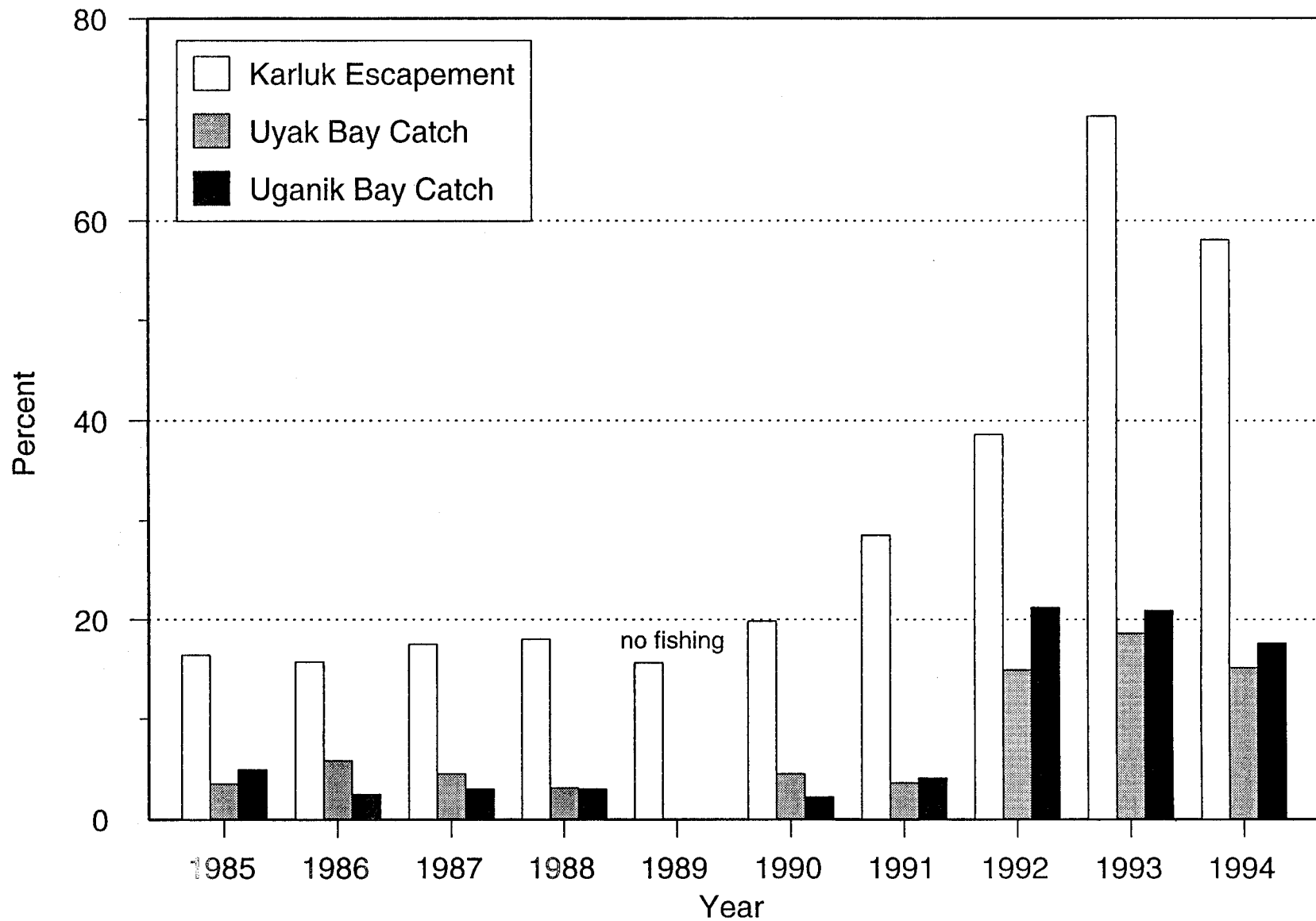


Figure 7. Relative frequency of age 3. (3.2, 3.3, and 3.4) sockeye in Karluk escapements through 21 July and catches from Uyak and Uganik Bays through 15 July, by year, 1985-1994.

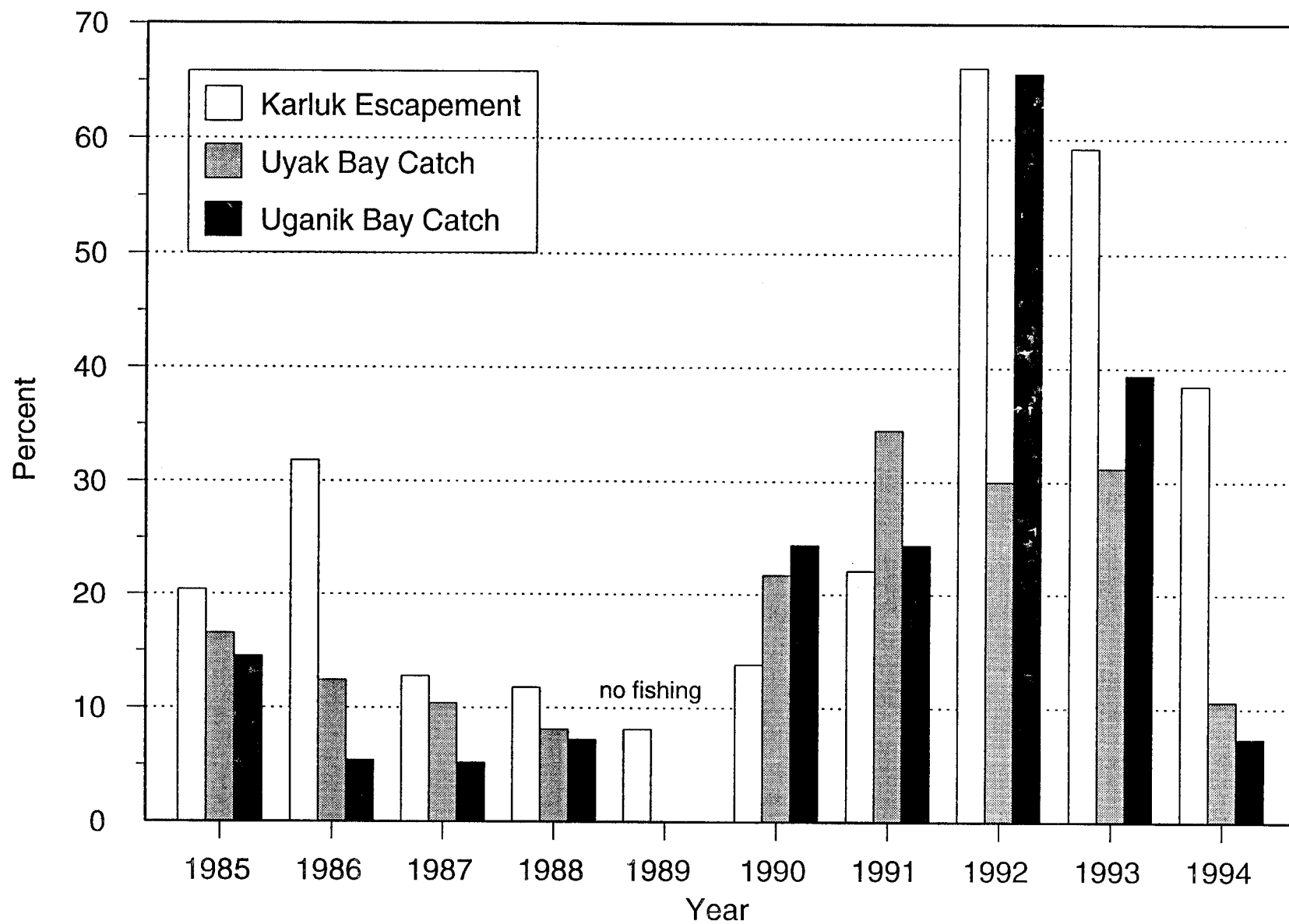


Figure 8. Relative frequency of age 3. (3.2, 3.3, and 3.4) sockeye in Karluk escapements post 21 July and catches from Uyak and Uganik Bays post 15 July, by year, 1985-1994.

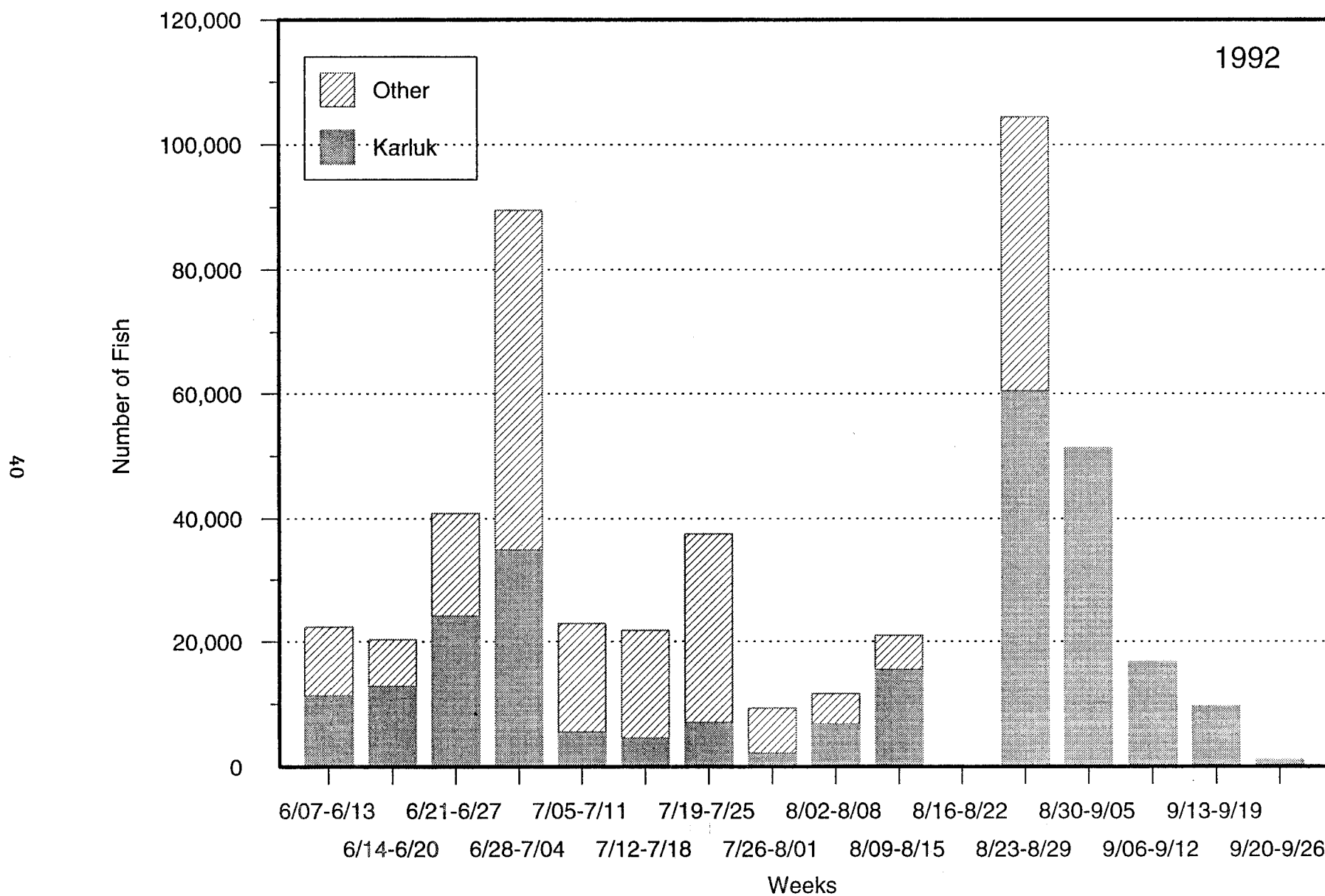


Figure 9. Contribution of Karluk origin sockeye salmon to the Uyak Bay (254-10-254-40) commercial fishery, by week, 1992.

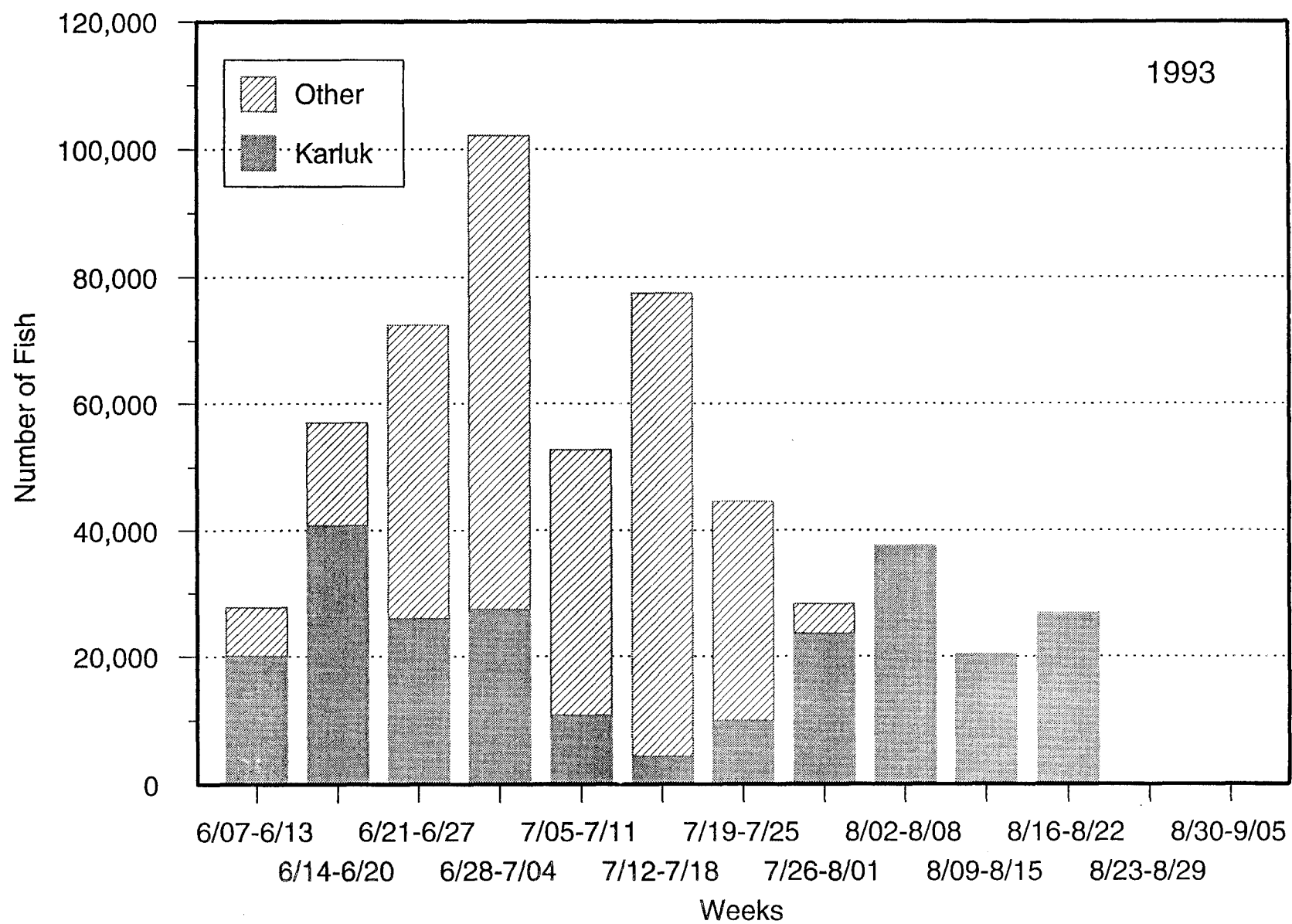


Figure 10. Contribution of Karluk origin sockeye salmon to the Uyak Bay (254-10-254-40) commercial fishery, by week, 1993.

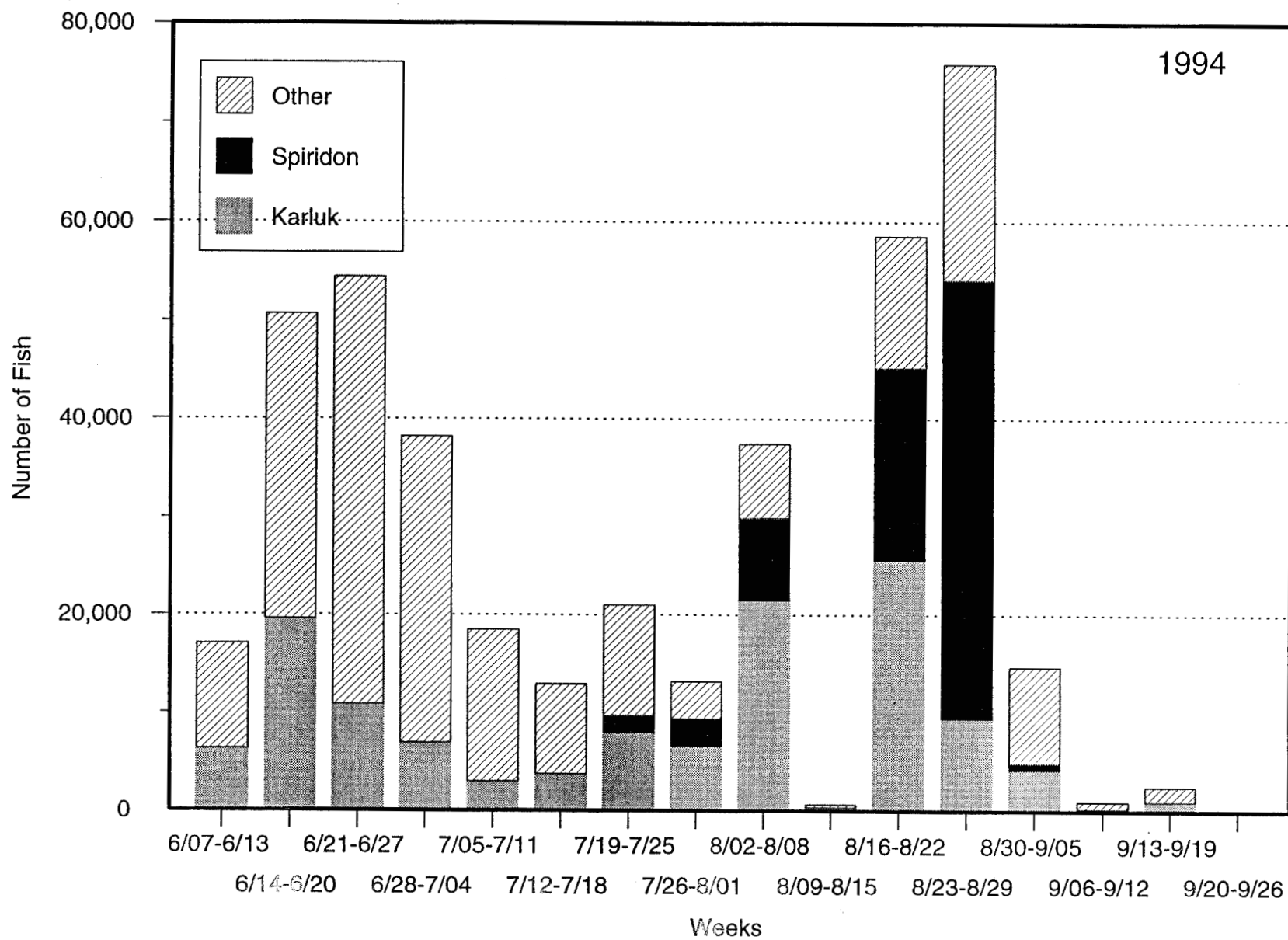


Figure 11. Contribution of Karluk and Spiridon origin sockeye salmon to the Uyak Bay (245-10-40) commercial fishery, by week, 1994.

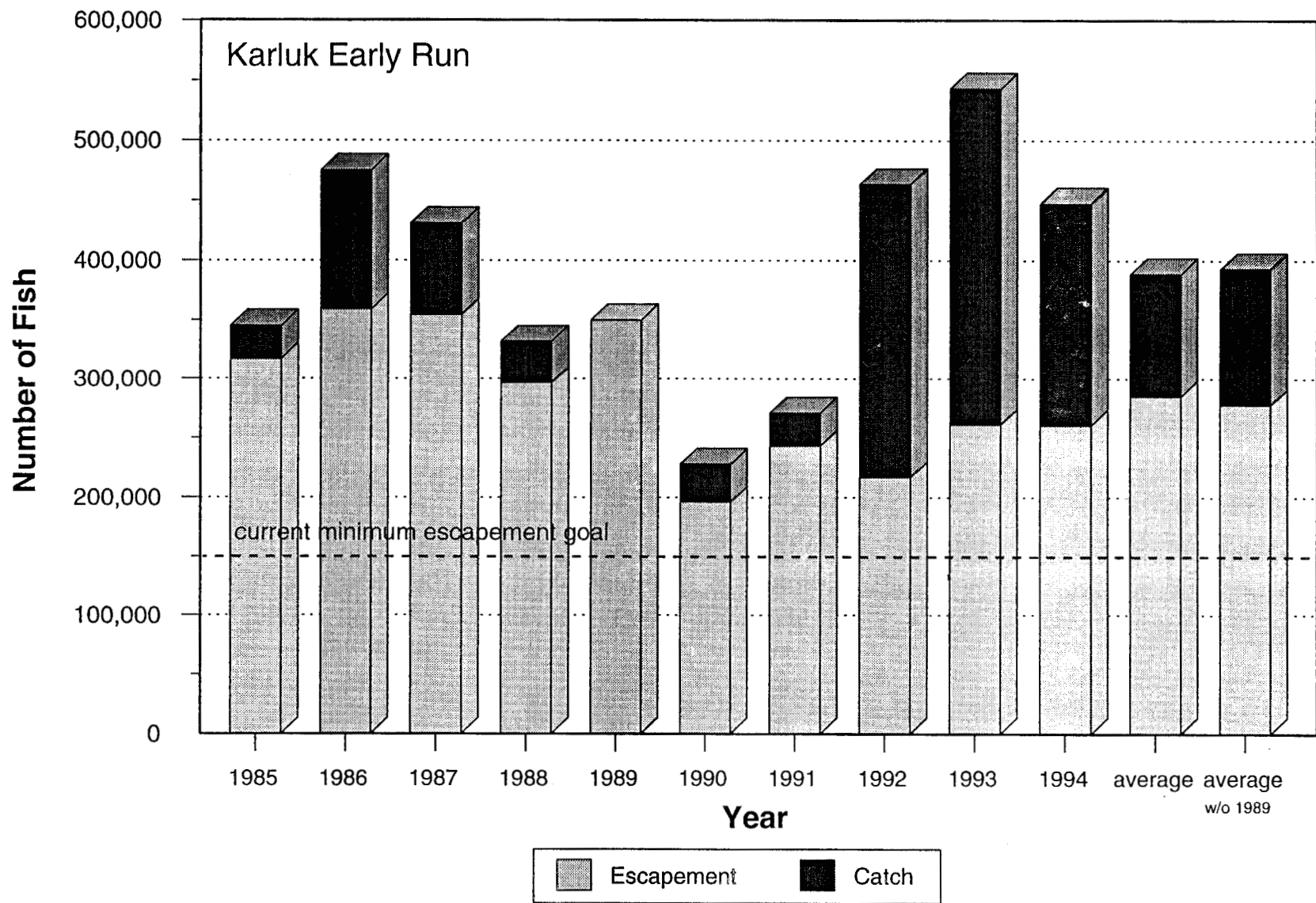


Figure 12. Karluk early run sockeye escapements and estimated catches by year, 1985-1994.

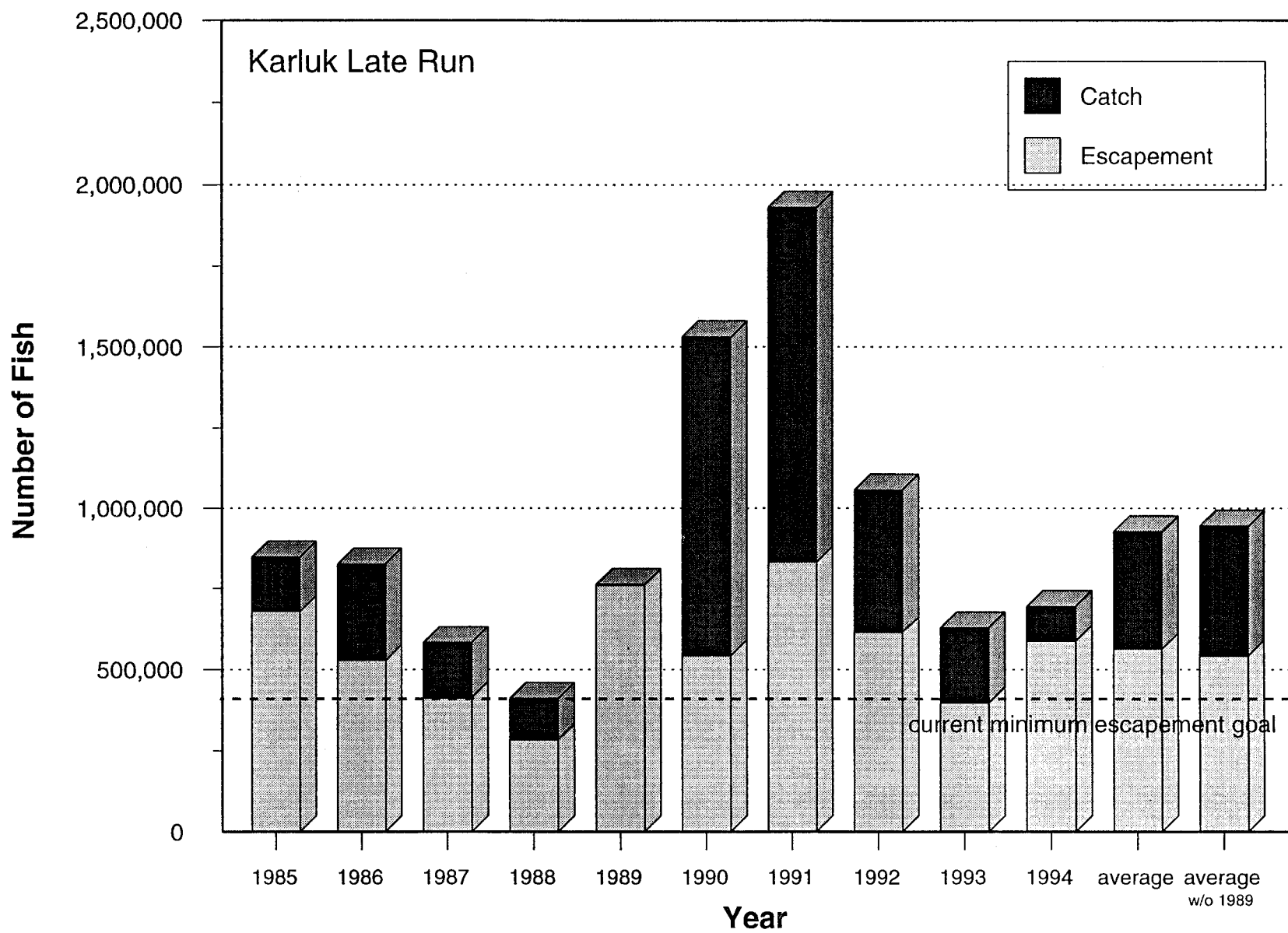


Figure 13. Karluk late run sockeye escapements and estimated catches by year, 1985-1994.

APPENDIX

Appendix A.1. Spreadsheet template used to estimate the Karluk contribution to westside catches using the age 3. marker.

		Age																
		0.2	1.1	0.3	1.2	2.1	0.4	1.3	2.2	3.1	1.4	2.3	3.2	2.4	3.3	4.2	4.4	Total
Actual	Fishery Est. #	102	224	328	4,230	102	0	20,363	20,773	0	328	11,872	2,775	0	224	0	0	61,321
w/o *.1	fishery est. #	102		328	4,230		0	20,363	20,773		328	11,872	2,775	0	224	0	0	60,995
w/o *.1	fishery est. %	0.2%	0.0%	0.5%	6.9%	0.0%	0.0%	33.4%	34.1%	0.0%	0.5%	19.5%	4.5%	0.0%	0.4%	0.0%	0.0%	100.0%
Actual	Karluk esc. est. #	0	1,244	0	7,828	18,604	0	10,664	176,282	4,085	0	46,083	41,742	0	10,157	0	0	316,688
w/o *.1	Karluk esc #	0		0	7,828		0	10,664	176,282		0	46,083	41,742	0	10,157	0	0	292,756
w/o *.1	Karluk esc %	0.0%	0.0%	0.0%	2.7%	0.0%	0.0%	3.6%	60.2%	0.0%	0.0%	15.7%	14.3%	0.0%	3.5%	0.0%	0.0%	100.0%
w/o 3.2&3	Karluk esc %	0.0%	0.0%	0.0%	3.3%	0.0%	0.0%	4.4%	73.2%	0.0%	0.0%	19.1%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Karluk contribution assigned to catch #		0	0	0	452	0	0	616	10,187	0	0	2,663	2,775	0	224	0	0	16,917

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